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The Regional Distribution of Greek Football Clubs

By Gregory T. Papanikos[*]

Greece is divided into 13 NUTS2 regions, each with distinct area, demographics, and economic characteristics. This paper examines the regional distribution of Greek football clubs. The analysis uses the total number of football clubs in the top three divisions. The study's main conclusion is that football clubs are unevenly distributed across regions relative to population size, geographical area and economic strength.

Keywords: *Greece, Football, Clubs, Regions, NUTS2, Population, Per capita GDP, Demographics*

Introduction

The issue of regional disparities has been widely examined both at the national and the European level. The most important index of measuring regional disparities is per capita Gross Domestic Product (GDP). Policies have been implemented to increase the convergence of regions by increasing the rate of growth of per capita GDP (reducing unemployment rates) of the lagging regions relative to regions that are above the average (Papanikos, 2024a). However, less attention has been paid to the unequal distribution of sports and fitness activities. This paper examines the regional distribution of football clubs in the 13 *Nomenclature des Unités Territoriales Statistiques* (NUTS2) Greek regions.

There is a strong cultural affinity to sports because Greeks consider themselves as birthplace of the Olympic Games.[1] It was also an integral part of the ancient Greek system of education where students learned not only how to read and write but how to maintain a balance between education and sports. The Greek word gymnasium was a place where along with the gymnastics there were rooms where philosophers could meet and organize philosophical symposiums.

Today sports in Greece plays is an integral part of its economic, political, social and cultural life and their unequal distribution among the 13 regions has been debated particularly after Athens was selected in 1977 to organize the 2004 Olympic Games. Rightly many regions show that this obligation will bias the development of sports in the region of Athens called Attica which is one of the 13 NUTS2 regions in Greece.[2] It is of interest to note that football was the only sport which was organized in various regions of Greece as part of the 2004 Olympic Games. New stadiums were built and old ones were renovated. These new investments were expected to increase the development of football in Greece.

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[*]President, The Athens Institute, Greece. The author has previously taught in many Canadian, Greek and U.K. Universities.

[1]I have written extensively on the Olympic Games; see, for example, Papanikos (2020, 2022).

[2]There is extensive literature on how sports, in general, can be used to develop small regions and communities; see Burke et al. (2014) for an example of such a study.

Football clubs have their own merit for at least two reasons. First, the existence of a football club in a region provides a sense of identity and bondage between its residents. In Greece this is truer at the level of NUTS3 regions rather than NUTS2 regions. Second, regions that lag behind football may be used as a vehicle for promoting economic growth.

The literature on football is not only extensive but so diverse that it is difficult to review it within the restricted context of this study. This journal has published many papers on various issues that deal exclusively with football and, in general, with professional team sports; see Barget et al. (2017), Binjwaied (2015), Cincimino (2014), Ellapen et al. (2014), Espitia-Escuer & Garcia-Cebrian (2015), Günter & Vischer (2024), Harman (2022), Ibrahim (2014), Leela et al. (2023, 2024), Leite W (2017), Magueta et al. (2015), Maugendre (2018), Nunes & Valério (2020), Ogunsanya & Rasheed (2019), Papanikos GT (2014, 2017, 2021, 2023, 2024c), Pfeffel et al. (2016, 2017), Suominen (2019), Vannier Borges (2018), and Zambom-Ferraresi et al. (2017).

This study is part of a larger project that aims at examining sports related issues at the regional level. In a study published in the previous issue of this journal, I presented the results of an analysis of the determinants of the geographical distribution of private business exercise centers in the wider area of Athens known as Attiki (Papanikos, 2024a), which was a follow up of another study that I conducted earlier on the economic effects of physical exercise (Papanikos, 2015). In the 2024 study, I used the 58 municipalities of Attiki and the geographical distribution of 214 fitness businesses to demonstrate how wealth and population relates to the under-or oversupply of physical exercise enterprises. It was found a positive effect of both wealth and population. The population effect was linear, while the wealth effect was non-linear; an increase in wealth increases the number of gyms in an area but at a decreasing rate. The study also identified unexplored opportunities for investing in small physical exercise enterprises as well as areas of oversupply.

This study looks at the regional distribution of Greek football teams. The literature on football is huge and this journal has published many papers on football and related issues. These issues also have a regional dimension that as part of the aforementioned project will be examined and published in this journal as separate papers. On football in general, I have conducted a number of studies. In Papanikos (2017) I examined the economic, population and political determinants of the 2014 world cup match results. The economic and population determinants are also examined here in this study as being associated with the number of football clubs in the 13 regions of Greece.

At the global and local level football creates news and sends us messages that goes beyond the narrow borders of the game. In a recent study, Papanikos (2023), I examined the global media coverage of the 2022 Qatar world football cup. Countries, regions and cities bid to host such events for a number of reasons which include favorable global, national and local media coverage serving economic, political, national, and cultural purposes. I know of no study that examines this issue at the regional level especially the Greek regions.

Regional Distribution of Football Clubs

Table 1 presents the regional distribution of Greek football clubs across the 13 NUTS2 regions, while Table 2 provides summary statistics. Greek football is organized into three divisions, with a total of 103 teams competing across all divisions. The first division consists of 14 teams (14% of the total), the second division includes 20 teams (19%), and the third division has 69 teams (67%).

There are several ways to analyze the distribution of football clubs. One approach is to consider the total number of teams. Two regions have more than 20 teams: Kentriki Makedonia (23 teams) and Attiki (21 teams). The former region includes Greece's second-largest city, Thessaloniki, while the latter includes Athens, the country's largest city. Notably, Athens itself is classified as both a NUTS2 and a NUTS3 region due to its large population relative to Greece's total population and its small area, as described in the following section. The region with the third-highest number of clubs is Peloponnisos, with 11 teams. All other regions have fewer than 10 teams. Voreio Aigaio has only one team, while Dytiki Makedonia and Dytiki Ellada each have only two teams.

Another way to examine the distribution of teams across the 13 Greek regions is by division. The most prominent teams are those in the 1st Division. Six of the 13 regions do not have a team in the 1st Division. Of those six, three regions are also unrepresented in the 2nd Division. However, every region has at least one team competing in the 3rd Division.

Table 1. *Number of Football Clubs by NUTS2 Greek Region (2024-25 Season)*

Region	Name	1st Division	2nd Division	3rd Division	Total	%
1	Anatoliki Makedonia, Thraki	0	1	7	8	8
2	Kentriki Makedonia	3	5	15	23	22
3	Dytiki Makedonia	0	0	2	2	2
4	Ipeiros	0	1	3	4	4
5	Thessalia	1	2	5	8	8
6	Sterea Ellada	2	0	6	8	8
7	Ionia Nisia	0	0	3	3	3
8	Dytiki Ellada	1	0	1	2	2
9	Peloponnisos	1	4	6	11	11
10	Attiki	5	5	11	21	20
11	Voreio Aigaio	0	0	1	1	1
12	Notio Aigaio	0	1	4	5	5
13	Kriti	1	1	5	7	7
	Total	**14**	**20**	**69**	**103**	**100**
	Percent	14%	19%	67%		

Source: Author's calculations from the official websites of the three divisions.

Table 2 presents summary statistics on the number of teams. The average number of teams per region is 1.1 in the 1st Division, 1.5 in the 2nd Division, and

5.3 in the 3rd Division. Overall, the average number of teams per region is 7.9, with a standard deviation of 6.9. The distribution shows positive skewness, and the kurtosis indicates that the distribution of teams is not normal.

Table 2. *Summary Statistics of Greek Football Clubs by NUTS2 Region (2024-25 Season)*

	1st Division	2nd Division	3rd Division	Total
Mean	1.1	1.5	5.3	7.9
Standard Deviation	1.5	1.9	4.0	6.9
Kurtosis	3.2	-0.2	1.9	1.3
Skewness	1.8	1.1	1.4	1.4
Range	5	5	14	22
Minimum	0	0	1	1
Maximum	5	5	15	23
Sum	14	20	69	103

However, these unequal distributions can be partially explained by differences in regional area, population, GDP, and per capita GDP. The associations between the number of teams and these four variables are examined in the fourth section of the paper, following a brief discussion of the overall and summary statistics of these variables in the next section.

Overview of Area, Population, GDP, and GDP per Capita by Greek Regions

Tables 3 and 4 display the raw data and summary statistics, respectively, for the four variables of interest in this paper: regional area in square kilometers, population in thousands, Gross Domestic Product (GDP) in 2022 (in millions of euros), and per capita GDP in euros.

All four indicators reveal substantial differences across the 13 Greek regions. The smallest region by area is Attiki, which includes the capital city of Athens, with an area of 3,808 square kilometers (the second smallest among all regions), a population of 3.8 million (the largest of the 13 regions), a GDP of 97 billion euros (also the largest among the regions), and a per capita GDP of 25,440 euros, which is the highest of all regions.

Kentriki Makedonia, the largest region by area, covers 19,416 square kilometers. It has the second-largest population and GDP, but lags in per capita GDP at 15,826 euros, placing it in the middle of all regions by this measure.

Table 3. *Area, Population, GDP and Per Capita GDP By 13 NUTS2 Greek Regions*

Region	Area[1] (km^2)	Population[2] (2021)	GDP[3] 2022 (in mil €)	GDP[4] per capita (€)
Anatoliki Makedonia, Thraki	14157	562201	8117	14438
Kentriki Makedonia	19146	1795669	28418	15826
Dytiki Makedonia	9451	254595	4552	17879
Ipeiros	9203	319991	4432	13850
Thessalia	14036	688255	10661	15490
Sterea Ellada	15549	508254	11475	22577
Ionia Nisia	2318	204532	3343	16344
Dytiki Ellada	11336	648220	9093	14028
Peloponnisos	15490	539535	9729	18033
Attiki	3808	3814064	97030	25440
Voreio Aigaio	3836	194943	2704	13871
Notio Aigaio	5286	327820	6737	20550
Kriti	8335	624408	10331	16545
Total	**131951**	**10482487**	**206620**	**19711**

Source: [1]https://shorturl.at/4L9uR; [2]https://elstat-outsourcers.statistics.gr/Census2022_GR.pdf; [3]https://shorturl.at/wTTHx [4]GDP divided by Population.

Table 4. *Summary Statistics*

	Area (km^2)	Population (2021)	GDP 2022 (in mil €)	GDP per capita (€)
Mean	10150	806345	15894	17298
Standard Deviation	5330	992589	25229	3594
Kurtosis	-1.15	7.90	10.87	0.83
Skewness	0.03	2.75	3.23	1.21
Range	16828	3619121	94325	11590
Minimum	2318	194943	2704	13850
Maximum	19146	3814064	97030	25440

The summary statistics for variability—standard deviation, minimum, maximum, skewness, and kurtosis—demonstrate significant differences among the regions across all four indicators. These disparities may explain the variations observed in the descriptive analysis presented in previous sections. The associations between the number of football teams per region and these four regional indicators are examined in detail in the following section.

Exploring the Relationships between Regional Team Counts and Area, Population, GDP, and GDP per Capita

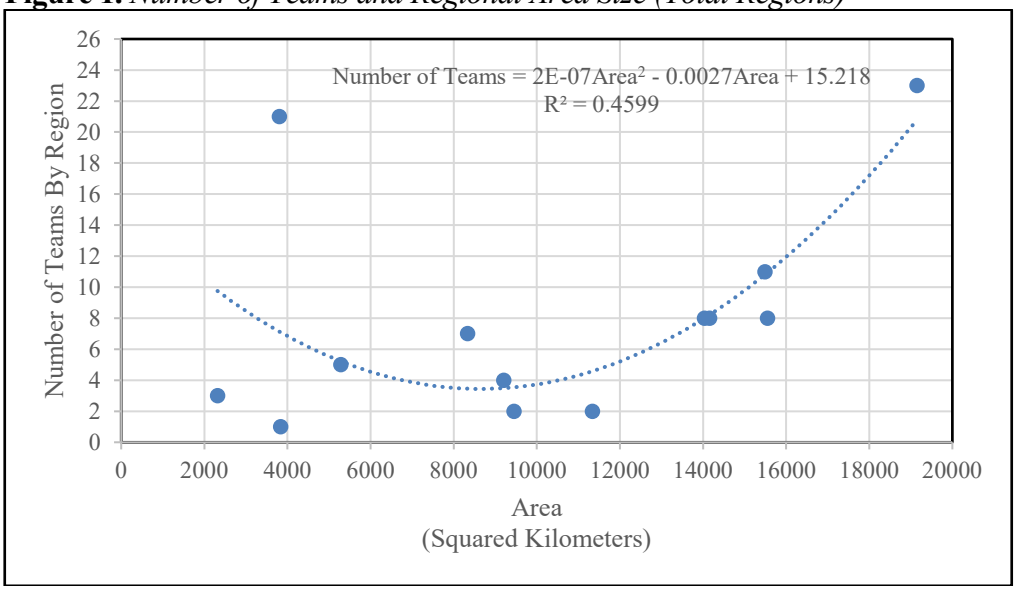
This section provides a descriptive analysis of the association between the number of football teams across the 13 Greek regions and regional characteristics such as area, population, GDP, and per capita GDP. All associations are expected to be positive at a certain range of values, meaning that an increase in any of these variables is anticipated to correspond with an increase in the total number of football teams within a region.

These relationships cannot be considered as either correlations or causal due to the limited number of observations, which restricts the ability to conduct a rigorous statistical analysis and reduces the degrees of freedom. However, the consistency of positive associations across all four variables lends support to the hypothesis of a potential cause-effect relationship, suggesting that these variables may influence the number of regional teams. In all cases, we use a second-degree polynomial alongside a scatter plot to illustrate the associations.

Number of Teams and Regional Area Size

Figure 1 illustrates the positive association between the size of a region and the number of football teams. The association is curvilinear, suggesting that as the area size increases, the number of teams initially decreases until reaching around 10,000 square kilometers, after which it begins to increase.

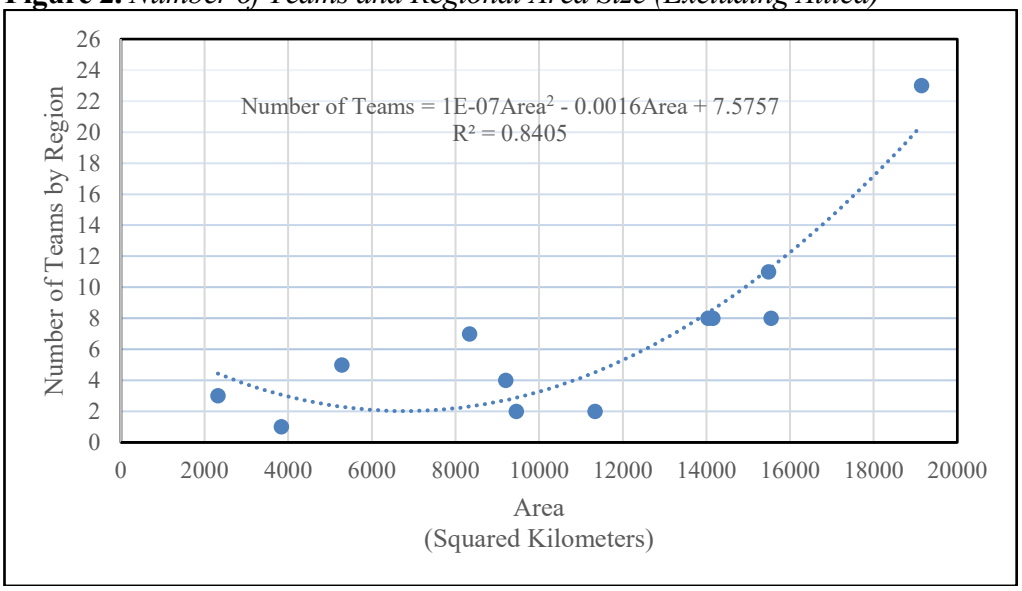
Figure 1. *Number of Teams and Regional Area Size (Total Regions)*



This observation remains consistent even if we exclude the special case (outlier) of the Attiki region, which has 21 teams and an area of approximately 3,800 square kilometers, as shown in Figure 2. Notably, the coefficient of determination nearly doubles (from 0.4599 to 0.8405) when the Attiki region is excluded. This pattern is

consistent across all associations that follow, so I have chosen not to report the graphs without Attiki. However, excluding Attiki does not alter the nature of the curvilinear relationship.

Figure 2. *Number of Teams and Regional Area Size (Excluding Attica)*



Number of Teams and Regional Population

Population plays an important role in determining the number of teams in a region due to the potential number of supporters and the resulting revenue streams that teams can attract. One might argue that a higher population, particularly among younger demographics, could be a valuable source of local talent for regional teams. However, as I discussed in a recent paper, Papanikos (2024c), Greek football is dominated by foreign players. There is a shortage of Greek players, and it is often unrealistic to expect a team to rely solely on talent from its own region.

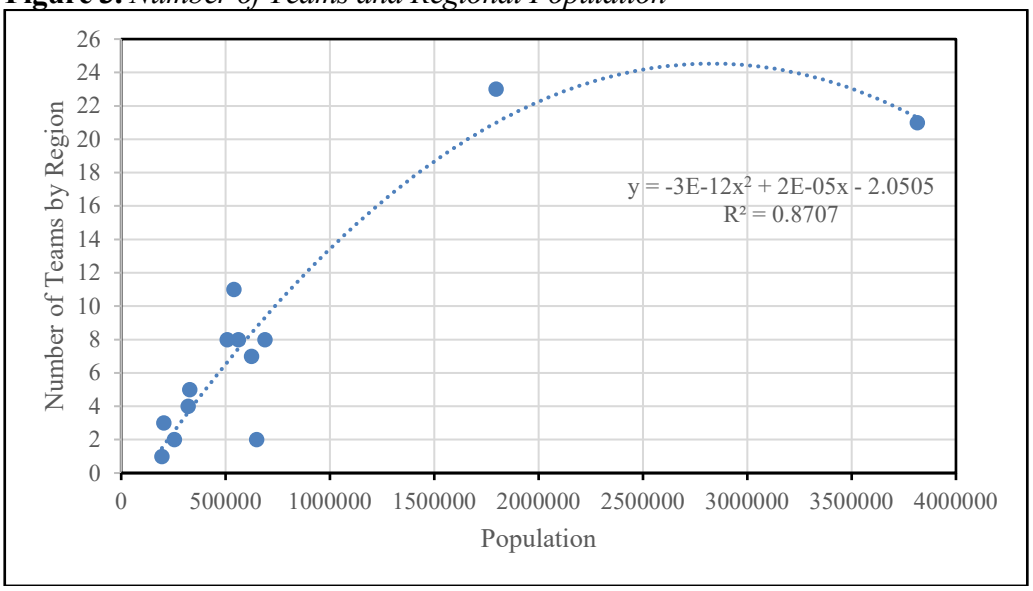
A higher population not only draws larger crowds but also boosts revenue from television rights and sponsorships. Nonetheless, a key challenge in developing strong regional teams is that most people do not support their local teams but rather favor the major Greek teams from the first division, of which there are only a few. When a prominent team plays against a local team, the visiting team often attracts more supporters than the local team.

Figure 3 illustrates the relationship between the number of teams and regional population. Excluding Attiki, the effect of population on team numbers is positive, increasing at a decreasing rate. However, when Attiki is included, as shown in Figure 3, the relationship becomes negative for population sizes above approximately 3 million.

One region stands out: based on its population, the Dytiki Ellada (Western Greece) region would be expected to have around 8 teams, yet it has only 2. This region includes Patras, the third-largest city in Greece, which lacks a team in the first division of Greek football. All other regions closely align with the fitted line, except for Peloponnisos, which has 11 teams—more than expected based on its

population. According to the model, Peloponnisos would be expected to have 7 teams. Similarly, the region of Kentriki Makedonia has 23 teams but would be expected to have 21 according to the fitted line.

Figure 3. *Number of Teams and Regional Population*



Number of Teams and Regional GDP and GDP per Capita

The most important economic variables considered here are total GDP and GDP per capita. Figures 4 and 5 display the relationship between these two economic indicators and the number of regional teams. Both associations are non-linear: one is concave (with a maximum), and the other is convex (with a minimum).

While this statistical analysis is limited by the low degrees of freedom, it nonetheless aligns well with economic reasoning. The association between total GDP and the number of teams suggests that as a region's total income rises, the optimal number of teams also increases, albeit at a decreasing rate, reaching a peak and then declining. In the graph, this peak occurs at a regional GDP of approximately 60 billion euros, at which point the number of football teams reaches 32. Notably, total GDP and the number of teams show an almost perfect fit, with a coefficient of determination of 0.913.

The analysis differs for GDP per capita. It begins with a minimum of 6 teams, corresponding to a per capita GDP of about 14,000 euros. However, for regions at this level of per capita GDP, there are significantly fewer teams than predicted by the fitted line. Furthermore, there are numerous outliers in this relationship. Kentriki Makedonia, for instance, stands out with 23 teams and a per capita GDP near 16,000 euros. The fit here is less precise than in the previous analysis, as indicated by the relatively low coefficient of determination of 0.2359.

Figure 4. *Number of Teams and Regional GDP*

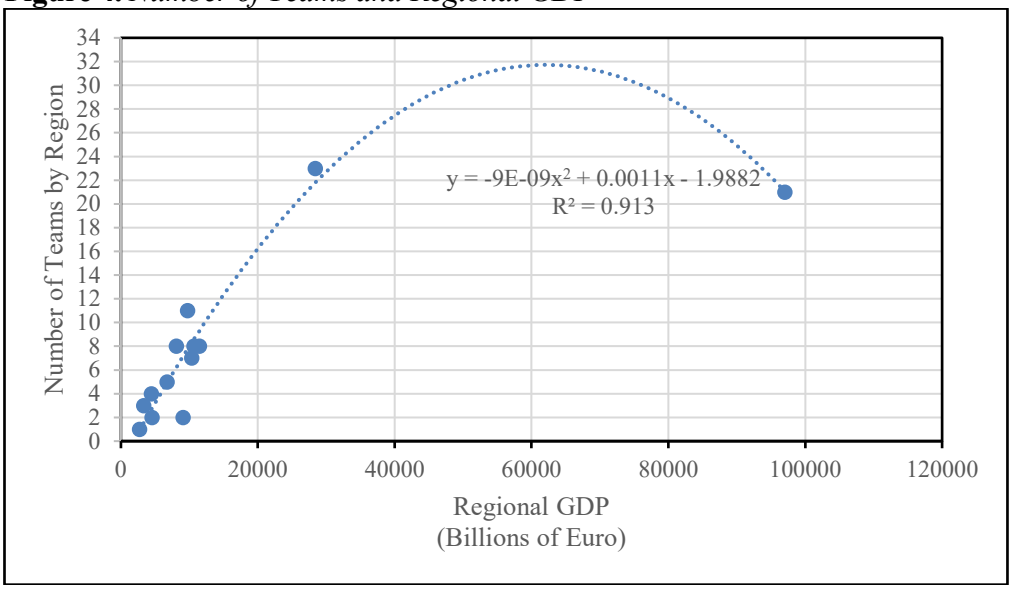
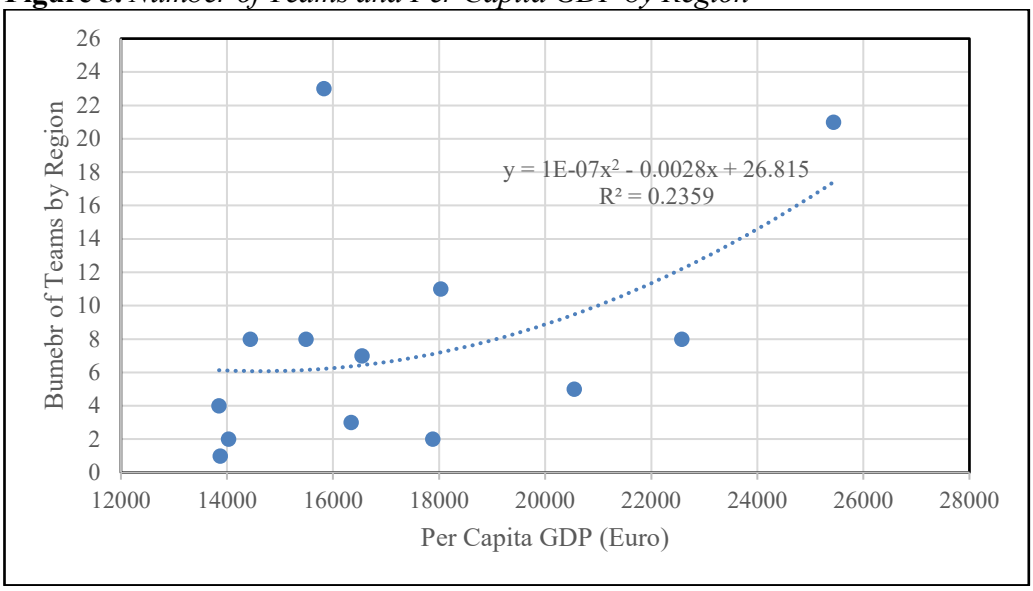


Figure 5. *Number of Teams and Per Capita GDP by Region*



If the overall fit of the curves reveals anything, it is that total GDP appears to be the most important variable, with the strongest association relative to all other variables examined here. This makes perfect economic sense, as it is something one would expect: a high GDP indicates that a region can afford to support more football teams.

Conclusions

This is not a proper statistical analysis due to the small number of observations, which limits the ability to test hypotheses and perform diagnostic tests. Thus, the aim of the study was restricted to examining scatter diagrams of the associations

between the number of teams in each of the 13 NUTS2 regions of Greece and four key variables that, at least theoretically, are expected to have an effect. Other empirical studies using different datasets have shown that these variables play a statistically significant role.

Despite this limitation, the descriptive statistics on the distribution of football clubs across the 13 Greek regions reveal significant variability that cannot be explained by differences in area, population, GDP, or per capita GDP. A notable example is Dytiki Ellada (Western Greece), which, according to the fitted line, should have 8 teams but instead has only 2. This region includes Patras, Greece's third-largest city, which does not have a team in the first division.

Overall, per capita GDP—often seen as a variable that might explain variations in demand for various goods, including football matches—does not appear to account for the distribution of football teams. Future research may shed light on why this is the case. Anecdotal evidence suggests that wealthy individuals who own Greek football teams may use these teams to generate revenue from other sources, such as illegal gambling through match-fixing. However, this analysis is beyond the scope of this paper.

Acknowledgments

This paper is part of a larger research project aimed at studying sports and fitness activities across various regions of Greece. In the previous issue of this journal, an empirical paper was published examining the distribution of fitness centers in the broader Attica region. I would like to thank the two anonymous reviewers for their constructive comments and suggestions.

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