

PROFITABILITY AND FINANCIAL STRUCTURE OF EUROPEAN SOCCER CLUBS: A FIRST INTERNATIONAL COMPARISON*

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Abstract. *Introduction and purpose.* Soccer is not only a sport and a spectacle but has also become a real business, to be managed appropriately. The sector is economically important in many countries and requires academics' attention. This research analyses the economic and financial dynamics of a sample of prominent soccer clubs in ten European countries where soccer is widespread. Literature review. There are numerous managerial studies of soccer sports enterprises. Few, however, have measured economic and financial performance based on balance sheets, making an international comparison. Research methodology. The financial statements of 10 soccer clubs for 2013-2022 were analysed, illustrating the average employee trend as an indicator of company size, Roe, and financial leverage. We subjected the data to statistical processing and used the ANOVA and Tukey-Kramer methods to compare the teams. Main results. The companies analysed have significant differences in size concerning the workforce. Profitability is almost always low, presumably due to high management costs for the most renowned players. Indebtedness is high. There are significant differences between countries. This study implements the economic literature on companies in the sport. Public policies should consider the sector relevant to many European nations' economies and leisure time.

Keywords: *Roe, Leverage, ANOVA, Tukey Kramer test*

JEL: G30, L83, Z20, Z23

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* This article is the result of collaboration between the two authors. *Guido Migliaccio* designed the research. He also analysed the literature and drafted the final considerations. The paragraphs 'Introduction', 'Literature Review', and 'Conclusions' can be attributed to him. *Luca Preziosi* selected the sample, identified and processed the data and represented them in tabular and graphical form. All other paragraphs can therefore be attributed to him.

Introduction. Over time, sports have taken on different roles in the social and individual spheres, from a mere tool to strengthen the body to a therapeutic and competitive factor (Del Guercio and Bifulco, 2016; Scarlata, 2015). However, despite the competitive emphasis, it has always fostered social relations. Respect for the rules and the opponent, traditionally associated with sports education, has more recently taken a back seat due to the considerable competitive pressures and the growing and very high economic interests (Pollo et al., 2011).

Unfortunately, success and popularity have become the primary goals of teams and sorcerers almost everywhere for years. The advent of mass media has amplified its social value and attracted investment, turning soccer into a business, with even illicit consequences (Giuffrè and Scuglia, 2018). From simple sports associations, soccer teams have evolved into economic enterprises regulated by financial fair play to optimise economic management (Ghio et al., 2019; Bellinazzo, 2015). Data analysis now makes it possible to verify the links between balance sheets and sporting results (Migliaccio et al., 2022; Risaliti and Verona, 2013). This paper examines the economic-financial performance of the ten most influential European soccer clubs, one for each nation. First, we investigated their size by considering the number of employees. We then used balance sheet data from 2013 to 2022 to assess the performance of two indices, ROE and Financial Leverage. The results show significant differences for all investigated parameters, as indicated by the Anova and post-Anova tests.

Literature review. This study examines the intersection between economics and sport in contemporary socio-economic dynamics, characterised by increased leisure time and the growing demand for entertainment, often satisfied by sporting activities (Wolf, 2003; Resciniti, 2004). The economy of entertainment, particularly the economy of sport, requires an interdisciplinary approach that integrates psychological and sociological elements since the consumer is looking for experiences beyond mere consumption, involving emotions and a sense of belonging. In the context of sport, these emotional dynamics combine with rational drivers, creating value for producers and consumers. Sport, with its multiple dimensions (educational, social, media, tourism), has an economic relevance that has been consolidated over time with the transition from amateurism to professionalism and the growing role of sponsorship and mass media (DeSarbo & Madrigal, 2012; Walzel & Roemisch, 2020). This has transformed the sport into a spectacle, differentiating it from other services by its unpredictability and the vital relational component between athletes and spectators. In economic terms, sports management can vary between neoclassical approaches, based on profit maximisation, and socio-economic models, in which collective utility and welfare objectives prevail (Caselli, 2003). In the context of professional soccer, it has been observed that the uncertainty of the outcome increases public interest, suggesting that the balanced distribution of talent among teams ensures a more exciting competition and is economically advantageous for leagues (Kesenne, 2006). Leagues play a crucial role in ensuring a sustainable competitive environment. One of the fundamental aspects of sports

economics is the relationship between athletic performance and financial outcomes, with a particular focus on revenues generated from sponsorships, broadcasting rights, and ticket sales.

Sporting success, although associated with increases in profitability, is often seen as an end for many organisations, particularly in soccer, where notoriety and social esteem carry significant weight (Sloane, 1971). However, economic-financial equilibrium remains an unavoidable constraint for teams, with measurable effects on players' transfer markets and the valuation of their contractual rights (Ghio et al., 2019). The international bibliography on the economics of sport has accelerated in recent decades, especially after the 'Bosman rule' of 1995, which liberalised the European soccer market (Szymanski, 2007). This change has stimulated studies on the player market and the impact of economic regulations. Recent contributions have focused on the relationship between player value and sporting performance, proposing measurement models that link sporting success to the economic productivity of teams (Guzmán & Morrow, 2007; Migliaccio & Corea, 2019).

Following this track, this paper aims to carry out a comparison between the best European teams to test the following hypotheses:

H1: the best teams are similar in size;

H2: profitability is stable and high;

H3: indebtedness is modest, assuming constant self-financing processes;

H4: there are no significant differences between teams, wherever they are located.

Research methodology. A sample of balance sheets of ten European soccer clubs, one per country where soccer is a relevant sport, was taken from the OrbisEurope entire database. The balance sheets cover ten years, from 2013 to 2022 (Table 1).

Table 1. **The nationality of the companies in the sample**

<i>Team name</i>	<i>Nation</i>
Manchester City	England
Bayern Munich	Germany
Juventus	Italy
Benfica	Portugal
Ajax	Oland
Seville	Spain
Lyon	France
Salzburg	Austria
Rangers	Scotland
Shakhtar Donetsk	Ukraine

Source: Our elaboration

Teams known for their considerable successes were chosen, especially for participating in the UEFA Champions League, Europe's prestigious soccer tournament. First, the size of each company was analysed and evaluated according to the number of employees, which showed considerable differences. Then, the ten-year trend of the Roe and Financial Leverage was analysed.

The graphical representation of the trend of the average annual data for each index also required the determination of the interpolating curve, using, as a rule, the polynomial equation of degree 6 that maximised the value of R². ANOVA methods (with a 0.05 significance level) and the Tukey-Kramer test were used to compare Nations. Each outcome is illustrated and commented on.

Main results. Number of employees This figure is frequently used to determine the size of companies. Table 2. shows the trend over the ten years 2013-2022.

Table 2. Number of employees - Trend (Data)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Manchester City	449	314	320	320	325	449	463	477	509	549
Bayern Munich	486	685	805	909	886	892	986	993	1026	1077
Juventus	125		155	100	102	236	250	270	270	281
Benfica							548	262	270	280
Ajax	340	378	394	391	402	478	374	475	409	448
Seville	234	238	255	328	362	432	444	423	397	
Lyon	249	255	274			414	458	517	531	579
Salzburg					130	160	128	128		120
Rangers	196	175	141	148	170	194	214	243	257	272
Shakhtar	591	579	530	474	343	316	306	294	288	240

Source: ORBIS Europe data processing.

A considerable difference is evident, presumably resulting from the prominence of soccer leagues in the different nations: Italy, Germany, Spain, and England have larger teams than Austria, Scotland and Ukraine. Several factors affect the popularity of soccer, such as geographical location and the resulting weather conditions that condition outdoor sports, tradition, past successes, etc. This also influences the economic aspects, where more fans or TV ratings are widespread.

To plot the trend graph of annual average values, we first determine the interpolation equation that maximises the R² value (Table 3).

Table 3. Number of employees - Equations of interpolating curves

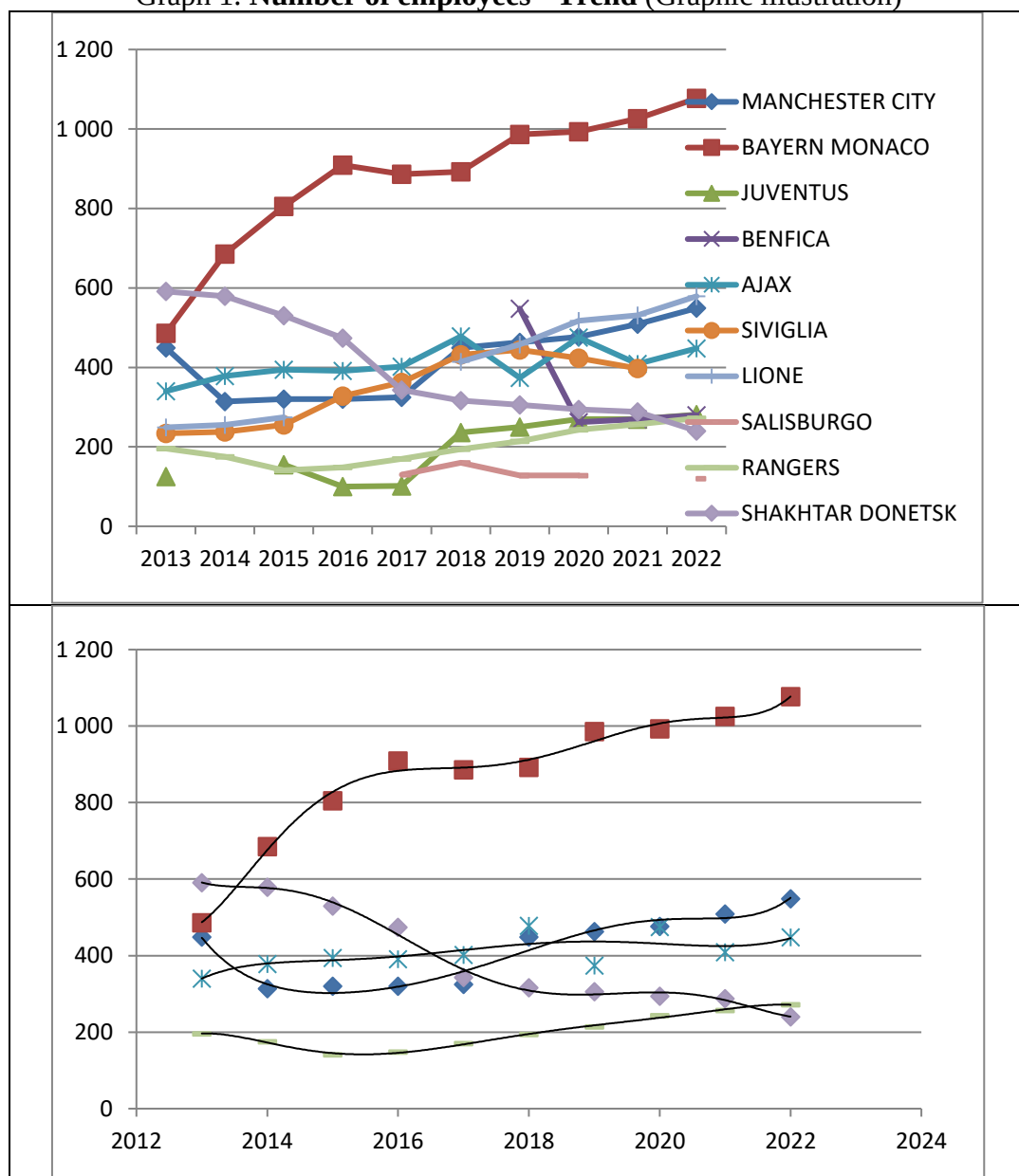
	Equation	R ²
Manchester City	$y = 0,029x^6 - 350,5x^5 + 2E+06x^4 - 5E+09x^3 + 7E+12x^2 - 6E+15x + 2E+18$	0,954
Bayern Munich	$y = 0,069x^6 - 835,6x^5 + 4E+06x^4 - 1E+10x^3 + 2E+13x^2 - 1E+16x + 5E+18$	0,990
Juventus	$y = -0,095x^6 + 1159x^5 - 6E+06x^4 + 2E+10x^3 - 2E+13x^2 + 2E+16x - 6E+18$	0,965
Benfica	$y = -48,66x^3 + 29506x^2 - 6E+08x + 4E+11$	1
Ajax	$y = -0,003x^6 + 44,62x^5 - 22544x^4 + 6E+08x^3 - 9E+11x^2 + 7E+14x - 3E+17$	0,526
Seville	$y = 0,017x^6 - 207,2x^5 + 1E+06x^4 - 3E+09x^3 + 4E+12x^2 - 3E+15x + 1E+18$	0,991
Lyon	$y = 0,014x^6 - 173,9x^5 + 87695x^4 - 2E+09x^3 + 4E+12x^2 - 3E+15x + 1E+18$	0,998

Salzburg	$y = -4x^4 + 32312x^3 - 1E+08x^2 + 1E+11x - 7E+13$	1
Rangers	$y = -0,017x^6 + 208,5x^5 - 1E+06x^4 + 3E+09x^3 - 4E+12x^2 + 3E+15x - 1E+18$	0,995
Shakhtar Donetsk	$y = 0,041x^6 - 507,7x^5 + 3E+06x^4 - 7E+09x^3 + 1E+13x^2 - 8E+15x + 3E+18$	0,993

Source: ORBIS Europe data processing

This results in Graph 1. showing the index trend; however, some companies are missing due to the unavailability of some data.

Graph 1. **Number of employees - Trend** (Graphic illustration)



Source: ORBIS Europe data processing.

Juventus has the lowest value. Bayern Munich, on the other hand, has the highest value. However, evident fluctuations are noticeable. The values were analysed using an ANOVA test to examine statistically significant differences across geographical areas (Table 4).

Table 4. Number of employees – Anova Test

Table with 5 columns: Group, Count, Sum, Average, Variance

SUMMARY						
Group	Count	Sum	Average	Variance		
Manchester City	10	4175	417,5	7948,94		
Bayern Munich	10	8745	874,5	31526,05		
Juventus	9	1789	198,77	5924,69		
Benfica	4	1360	340	19282,66		
Ajax	10	4089	408,9	2020,32		
Seville	9	3113	345,88	7324,86		
Lyon	8	3277	409,62	17915,98		
Salzburg	5	666	133,2	239,2		
Rangers	10	2010	201	2025,55		
Shakhtar Donetsk	10	3961	396,1	17696,32		
ANALYSIS OF VARIANCE						
Origin variation	SQ	dof	MQ	F	Significance value	F crit
Between groups	3405522,669	9	378391,40	33,73803	6,87145E-23	2,0072603
In groups	841167,9194	75	11215,57			
Total	4246690,588	84				

Source: ORBIS Europe data processing.

The variance has an F-value of 33.73, which is higher than F crit (2.00): this indicates the presence of statistically significant differences between the averages of the ten companies considered, to be identified using the Tukey- Kramer Test (Table 5).

Table5. Number of employees - Tukey Kramer test

Average Manchester City	417,5
n Manchester City	10
Average Bayern Munich	874,5
n Bayern Munich	10
Average Juventus	198,77
n Juventus	9
Average Benfica	340
n Benfica	4
Average Ajax	408,9
n Ajax	10
Average Seville	345,88

n Seville	9
Average Lyon	409,62
n Lyon	8
Average Salzburg	133,2
n Salzburg	5
Average Rangers	201
n Rangers	10
Average Shakhtar Donetsk	396,1
n Shakhtar Donetsk	10
MQ	11215,57226
Q Statistic	4,65
Comparison between Manchester City and Bayern Munich	
Absolute difference	457
Standard error of the difference	33,48965849
Critical range	155,9941928
The average between Manchester City and Bayern Munich is	Different
Comparison between Manchester City and Juventus	
Absolute difference	218,73
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Manchester City and Juventus is	Different
Comparison between Manchester City and Benfica	
Absolute difference	77,5
Standard error of the difference	44,30265393
Critical range	206,0073408
The average between Manchester City and Benfica is	Not Different
Comparison between Manchester City and Ajax	
Absolute difference	8,6
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Manchester City and Ajax is	Not Different
Comparison between Manchester City and Seville	
Absolute difference	71,62
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Manchester City and Seville is	Not Different
Comparison between Manchester City and Lyon	
Absolute difference	7,88
Standard error of the difference	35,52114693
Critical range	165,1733332
The average between Manchester City and Lyon is	Not Different
Comparison between Manchester City and Salzburg	
Absolute difference	284,3
Standard error of the difference	41,01628748
Critical range	190,7257368
The average between Manchester City and Salzburg is	Different
Comparison between Manchester City and Rangers	
Absolute difference	216,5
Standard error of the difference	33,48965849

Critical range	155,726912
The average between Manchester City and Rangers is	Different
Comparison between Manchester City and Shakhtar Donetsk	
Absolute difference	21,4
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Manchester City and Shakhtar Donetsk is	Not Different
Comparison between Bayern Munich and Juventus	
Absolute difference	675,73
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Bayern Munich and Juventus is	Different
Comparison between Bayern Munich and Benfica	
Absolute difference	534,5
Standard error of the difference	44,30265393
Critical range	206,0073408
The average between Bayern Munich and Benfica is	Different
Comparison between Bayern Munich and Ajax	
Absolute difference	456,6
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Bayern Munich and Ajax is	Different
Comparison between Bayern Munich and Seville	
Absolute difference	528,62
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Bayern Munich and Seville is	Different
Comparison between Bayern Munich and Lyon	
Absolute difference	464,88
Standard error of the difference	35,52114693
Critical range	165,1733332
The average between Bayern Munich and Lyon is	Different
Comparison between Bayern Munich and Salzburg	
Absolute difference	741,3
Standard error of the difference	41,01628748
Critical range	190,7257368
The average between Bayern Munich and Salzburg is	Different
Comparison between Bayern Munich and Rangers	
Absolute difference	673,5
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Bayern Munich and Rangers is	Different
Comparison between Bayern Munich and Shakhtar Donetsk	
Absolute difference	478,4
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Bayern Munich and Shakhtar Donetsk is	Different
Comparison between Juventus and Benfica	

Absolute difference	141,23
Standard error of the difference	45,00037645
Critical range	209,2517505
The average between Juventus and Benfica is	Not Different
Comparison between Juventus and Ajax	
Absolute difference	210,13
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Juventus and Ajax is	Different
Comparison between Juventus and Seville	
Absolute difference	147,11
Standard error of the difference	35,30119963
Critical range	164,1505783
The average between Juventus and Seville is	Not Different
Comparison between Juventus and Lyon	
Absolute difference	210,85
Standard error of the difference	36,3876437
Critical range	169,2025432
The average between Juventus and Lyon is	Different
Comparison between Juventus and Salzburg	
Absolute difference	65,57
Standard error of the difference	41,76894269
Critical range	194,2255835
The average between Juventus and Salzburg is	Not Different
Comparison between Juventus and Rangers	
Absolute difference	2,33
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Juventus and Rangers is	Not Different
Comparison between Juventus and Shakhtar Donetsk	
Absolute difference	197,33
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Juventus and Shakhtar Donetsk is	Different
Comparison between Benfica and Ajax	
Absolute difference	68,9
Standard error of the difference	44,30265393
Critical range	206,0073408
The average between Benfica and Ajax is	Not Different
Comparison between Benfica and Seville	
Absolute difference	5,88
Standard error of the difference	45,0037645
Critical range	209,2517505
The average between Benfica and Seville is	Not Different
Comparison between Benfica and Lyon	
Absolute difference	69,62
Standard error of the difference	45,8576035
Critical range	213,2378563
The average between Benfica and Lyon is	Not Different
Comparison between Benfica and Salzburg	

Absolute difference	206,8
Standard error of the difference	50,23448774
Critical range	233,590368
The average between Benfica and Salzburg is	Not Different
Comparison between Benfica and Rangers	
Absolute difference	139
Standard error of the difference	44,30265393
Critical range	206,0073408
The average between Benfica and Rangers is	Not Different
Comparison between Benfica and Shakhtar Donetsk	
Absolute difference	56,1
Standard error of the difference	44,30265393
Critical range	206,0073408
The average between Benfica and Shakhtar Donetsk is	Not Different
Comparison between Ajax and Seville	
Absolute difference	63,02
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Ajax and Seville is	Not Different
Comparison between Ajax and Lyon	
Absolute difference	0,72
Standard error of the difference	35,52114693
Critical range	165,1733332
The average between Ajax and Lyon is	Not Different
Comparison between Ajax and Salzburg	
Absolute difference	275,7
Standard error of the difference	41,01628748
Critical range	190,7257368
The average between Ajax and Salzburg is	Different
Comparison between Ajax and Rangers	
Absolute difference	207,9
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Ajax and Rangers is	Different
Comparison between Ajax and Shakhtar Donetsk	
Absolute difference	12,8
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Ajax and Shakhtar Donetsk is	Not Different
Comparison between Seville and Lyon	
Absolute difference	63,74
Standard error of the difference	36,3876437
Critical range	169,2025432
The average between Seville and Lyon is	Not Different
Comparison between Seville and Salzburg	
Absolute difference	212,68
Standard error of the difference	41,76894269
Critical range	194,2255835
The average between Seville and Salzburg is	Different
Comparison between Seville and Rangers	
Absolute difference	144,88

Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Seville and Rangers is	Not Different
Comparison between Seville and Shakhtar Donetsk	
Absolute difference	50,22
Standard error of the difference	34,4073533
Critical range	159,9941928
The average between Seville and Shakhtar Donetsk is	Not Different
Comparison between Lyon and Salzburg	
Absolute difference	276,42
Standard error of the difference	42,69110554
Critical range	198,5136408
The average between Lyon and Salzburg is	Different
Comparison between Lyon and Rangers	
Absolute difference	208,62
Standard error of the difference	35,52114693
Critical range	165,1733332
The average between Lyon and Rangers is	Different
Comparison between Lyon and Shakhtar Donetsk	
Absolute difference	13,52
Standard error of the difference	35,52114693
Critical range	165,1733332
The average between Lyon and Shakhtar Donetsk is	Not Different
Comparison between Salzburg and Rangers	
Absolute difference	67,8
Standard error of the difference	41,01628748
Critical range	190,7257368
The average between Salzburg and Rangers is	Not Different
Comparison between Salzburg and Shakhtar Donetsk	
Absolute difference	262,9
Standard error of the difference	41,01628748
Critical range	190,7257368
The average between Salzburg and Shakhtar Donetsk is	Different
Comparison between Rangers and Shakhtar Donetsk	
Absolute difference	195,1
Standard error of the difference	33,48965849
Critical range	155,726912
The average between Rangers and Shakhtar Donetsk is	Different

Source: ANOVA data processing.

ROE. Return on equity is a ratio representing, in percentage terms, the company's overall profitability. The formula is therefore: $\text{Roe} = (\text{Net Income}/\text{Equity}) * 100$ Table 6 shows the development of Roe over the ten years 2013-2022.

Table 6. ROE - Trend (Data)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Manchester City	-18,2	-4,01	1,59	3,03	0,16	1,40	1,33	-19,9	0,36	5,98
Bayern Munich	5,45	4,40	6,10	7,94	8,84	6,47	10,5	1,99	0,39	2,52
Juventus	-32,7	-15,6	5,15	7,61	45,3	-26,6	-127	-37,4	-738	-150
Benfica	43,6	-168	1229	97,5	65,7	23,7	25,3	25,8	-12,1	-32,1
Ajax	25,3	18,8	19,9	-0,67	31,1	0,75	24,7	9,03	-3,63	-12,3
Seville	8,94	14,9	17,1	29,1	30,5	25,4	2,43	1,20	-73,2	
Lyon	-36,8	-25,1	-15,7	6,76	1,88	2,81	2,32	-15,8	-87,8	-69,2
Salzburg					99,2	16,6	53,3	47,9	4,78	14,43
Rangers	-62,1	-35,1	-38,4	-4,44	-12,5	-26,1	-24,3	-43,4	-87,6	-9,89
Shakhtar	9,08	-26,3	-18	-17,7	-57,1	-12,5	-9,17	-44,6	-60	-25,9

Source: ORBIS Europe data processing

Roe's analysis reveals alternating positive and negative values. Juventus has the lowest value, and Benfica has the highest. The others show a relatively more stable trend. To plot the trend graph of the annual average values, we first determine the interpolation equation that maximises the R^2 value (Table 7).

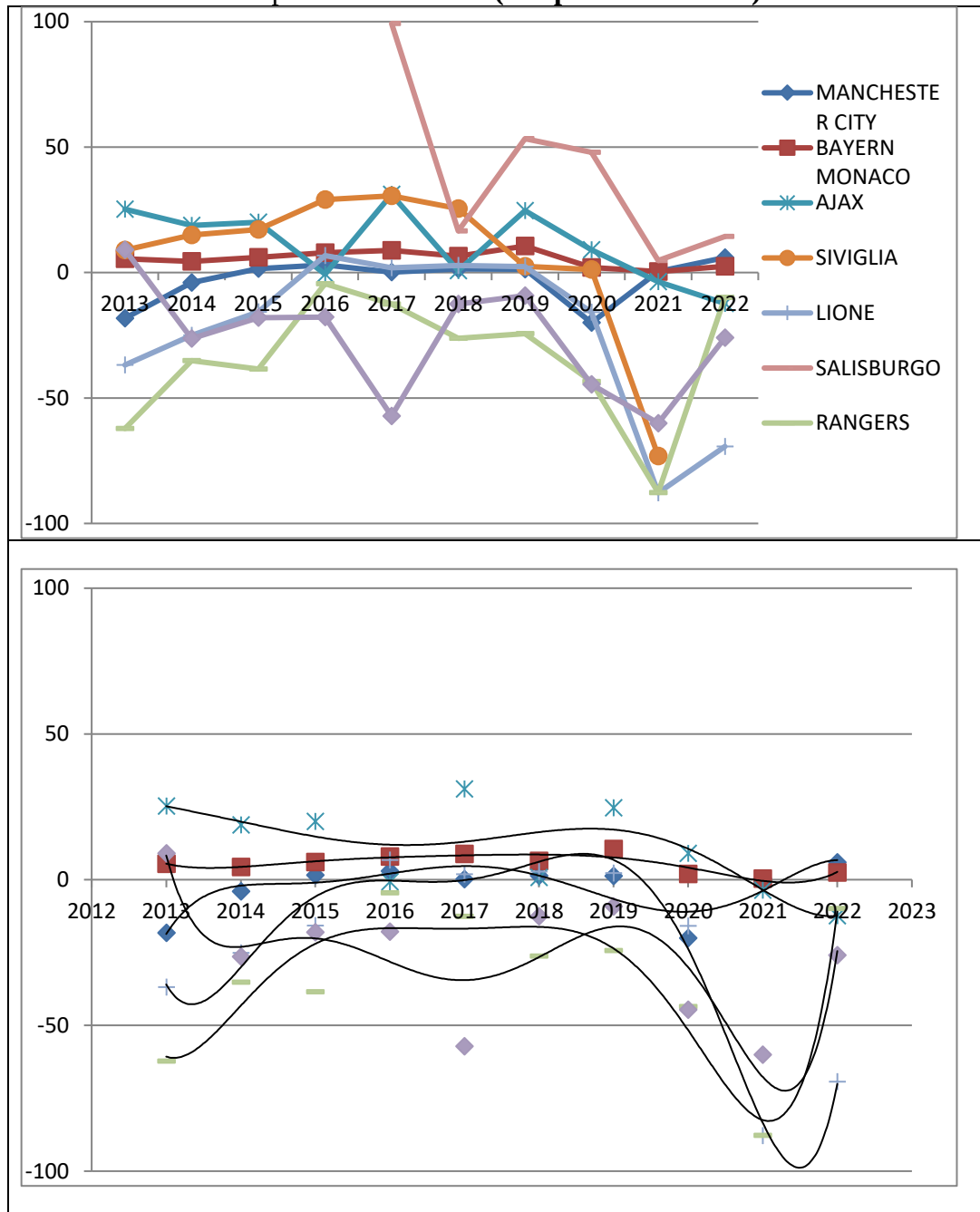
Table 7. ROE - Equations of interpolating curves

	Equation	R^2
Manchester City	$y = -0,011x^6 + 140,3x^5 - 70769x^4 + 2E+09x^3 - 3E+12x^2 + 2E+15x - 8E+17$	0,730
Bayern Munich	$y = 0,002x^6 - 34,17x^5 + 17232x^4 - 5E+08x^3 + 7E+11x^2 - 6E+14x + 2E+17$	0,793
Juventus	$y = 0,454x^6 - 5503, x^5 + 3E+07x^4 - 7E+10x^3 + 1E+14x^2 - 9E+16x + 3E+19$	0,840
Benfica	$y = 1,014x^6 - 12275x^5 + 6E+07x^4 - 2E+11x^3 + 3E+14x^2 - 2E+17x + 7E+19$	0,546
Ajax	$y = 0,003x^6 - 43,38x^5 + 21868x^4 - 6E+08x^3 + 9E+11x^2 - 7E+14x + 2E+17$	0,578
Seville	$y = -0,060x^6 + 735,1x^5 - 4E+06x^4 + 1E+10x^3 - 2E+13x^2 + 1E+16x - 4E+18$	0,993
Lyon	$y = 0,043x^6 - 525,1x^5 + 3E+06x^4 - 7E+09x^3 + 1E+13x^2 - 9E+15x + 3E+18$	0,969
Salzburg	$y = -0,669x^5 + 6765, x^4 - 3E+07x^3 + 6E+10x^2 - 6E+13x + 2E+16$	1
Rangers	$y = 0,031x^6 - 380,9x^5 + 2E+06x^4 - 5E+09x^3 + 8E+12x^2 - 6E+15x + 2E+18$	0,880
Shakhtar Donetsk	$y = 0,046x^6 - 562,8x^5 + 3E+06x^4 - 8E+09x^3 + 1E+13x^2 - 9E+15x + 3E+18$	0,731

Source: ORBIS Europe data processing

This results in Graph 2, which shows the trend of the index. In order to make the trends of the majority of the teams more transparent, the lines and curves of Benfica and Juventus have been removed, which would have compromised the representation. Some unavailable data is also missing.

Graph 2. Roe - Trend (Graphic illustration)



Source: ORBIS Europe data processing.

To assess statistically significant differences between the teams, the values were analysed using an ANOVA test (Table 8).

Table 8. ROE – Anova Test

One-factor variance analysis						
SUMMARY						
Group	Count	Sum	Average	Variance		
Manchester City	10	-28,377	-2,8377	79,83755		
Bayern Munich	10	54,662	5,4662	10,27370		
Juventus	10	-1070,22	-107,022	52727,504		
Benfica	10	1298,947	129,8947	154575,80		
Ajax	10	113,128	11,3128	215,71398		
Seville	9	56,631	6,2923	1004,7237		
Lyon	10	-236,883	-23,6883	1050,1382		
Salzburg	6	236,328	39,388	1237,3719		
Rangers	10	-344,287	-34,4287	650,18967		
Shakhtar Donetsk	10	-262,547	-26,2547	478,28358		
ANALYSIS OF VARIANCE						
Origin variation	SQ	dof	MQ	F	Significance value	F crit
Between groups	318594,1139	9	35399,345	1,58173	0,13374224	1,991948
In groups	1902314,383	86	22380,169			
Total	2220908,496	95				

Source: ORBIS Europe data processing

The variance of Roe has an F value of 1.58, which is lower than the F crit (1.99): there are statistically significant differences to be detected with the Tukey Kramer Test (Table 9).

Table 9. ROE - Tukey Kramer test

Average Manchester City	-2,8377
n Manchester City	10
Average Bayern Munich	5,4662
n Bayern Munich	10
Average Juventus	-107,022
n Juventus	10
Average Benfica	129,8947
n Benfica	10
Average Ajax	11,3128
n Ajax	10
Average Seville	6,2923333
n Seville	9
Average Lyon	-23,6883
n Lyon	10
Average Salzburg	39,388
n Salzburg	6
Average Rangers	-34,4287
n Rangers	10
Average Shakhtar Donetsk	-26,2547

n Shakhtar Donetsk	10
MQ	22380,1692
Q Statistic	4,65
Comparison between Manchester City and Bayern Munich	
Absolute difference	8,3039
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Bayern Munich is	Not Different
Comparison between Manchester City and Juventus	
Absolute difference	104,1843
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Juventus is	Not Different
Comparison between Manchester City and Benfica	
Absolute difference	132,7324
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Benfica is	Not Different
Comparison between Manchester City and Ajax	
Absolute difference	14,1505
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Ajax is	Not Different
Comparison between Manchester City and Seville	
Absolute difference	9,130033333
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Manchester City and Seville is	Not Different
Comparison between Manchester City and Lyon	
Absolute difference	20,8506
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Lyon is	Not Different
Comparison between Manchester City and Salzburg	
Absolute difference	42,2257
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Manchester City and Salzburg is	Not Different
Comparison between Manchester City and Rangers	
Absolute difference	31,591
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Rangers is	Not Different
Comparison between Manchester City and Shakhtar Donetsk	
Absolute difference	23,417
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Manchester City and Shakhtar Donetsk is	Not Different
Comparison between Bayern Munich and Juventus	
Absolute difference	112,4882
Standard error of the difference	47,30768353

Critical range	219,9807284
The average between Bayern Munich and Juventus is	Not Different
Comparison between Bayern Munich and Benfica	
Absolute difference	124,4285
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Bayern Munich and Benfica is	Not Different
Comparison between Bayern Munich and Ajax	
Absolute difference	5,8466
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Bayern Munich and Ajax is	Not Different
Comparison between Bayern Munich and Seville	
Absolute difference	0,826133333
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Bayern Munich and Seville is	Not Different
Comparison between Bayern Munich and Lyon	
Absolute difference	29,1545
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Bayern Munich and Lyon is	Not Different
Comparison between Bayern Munich and Salzburg	
Absolute difference	33,9218
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Bayern Munich and Salzburg is	Not Different
Comparison between Bayern Munich and Rangers	
Absolute difference	39,8949
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Bayern Munich and Rangers is	Not Different
Comparison between Bayern Munich and Shakhtar Donetsk	
Absolute difference	31,7209
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Bayern Munich and Shakhatar Donetsk is	Not Different
Comparison between Juventus and Benfica	
Absolute difference	236,9167
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Juventus and Benfica is	Different
Comparison between Juventus and Ajax	
Absolute difference	118,3348
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Juventus and Ajax is	Not Different
Comparison between Juventus and Seville	
Absolute difference	113,3143333
Standard error of the difference	48,60402446
Critical range	226,0087138

The average between Juventus and Seville is	Not Different
Comparison between Juventus and Lyon	
Absolute difference	83,3337
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Juventus and Lyon is	Not Different
Comparison between Juventus and Salzburg	
Absolute difference	146,41
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Juventus and Salzburg is	Not Different
Comparison between Juventus and Rangers	
Absolute difference	72,5933
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Juventus and Rangers is	Not Different
Comparison between Juventus and Shakhtar Donetsk	
Absolute difference	80,7673
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Juventus and Shakhtar Donetsk is	Not Different
Comparison between Benfica and Ajax	
Absolute difference	118,5819
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Benfica and Ajax is	Not Different
Comparison between Benfica and Seville	
Absolute difference	123,6023667
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Benfica and Seville is	Not Different
Comparison between Benfica and Lyon	
Absolute difference	153,583
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Benfica and Lyon is	Not Different
Comparison between Benfica and Salzburg	
Absolute difference	90,5067
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Benfica and Salzburg is	Not Different
Comparison between Benfica and Rangers	
Absolute difference	164,3234
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Benfica and Rangers is	Not Different
Comparison between Benfica and Shakhtar Donetsk	
Absolute difference	156,1494
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Benfica and Shakhtar Donetsk is	Not Different

Comparison between Ajax and Seville	
Absolute difference	5,020466667
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Ajax and Seville is	Not Different
Comparison between Ajax and Lyon	
Absolute difference	35,0011
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Ajax and Lyon is	Not Different
Comparison between Ajax and Salzburg	
Absolute difference	28,0752
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Ajax and Salzburg is	Not Different
Comparison between Ajax and Rangers	
Absolute difference	45,7415
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Ajax and Rangers is	Not Different
Comparison between Ajax and Shakhtar Donetsk	
Absolute difference	37,5675
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Ajax and Shakhtar Donetsk is	Not Different
Comparison between Seville and Lyon	
Absolute difference	29,98063333
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Seville and Lyon is	Not Different
Comparison between Seville and Salzburg	
Absolute difference	33,09566667
Standard error of the difference	55,75263971
Critical range	259,2497746
The average between Seville and Salzburg is	Not Different
Comparison between Seville and Rangers	
Absolute difference	40,72103333
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Seville and Rangers is	Not Different
Comparison between Seville and Shakhtar Donetsk	
Absolute difference	32,54703333
Standard error of the difference	48,60402446
Critical range	226,0087138
The average between Seville and Shakhtar Donetsk is	Not Different
Comparison between Lyon and Salzburg	
Absolute difference	63,0763
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Lyon and Salzburg is	Not Different
Comparison between Lyon and Rangers	

Absolute difference	10,7404
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Lyon and Rangers is	Not Different
Comparison between Lyon and Shakhtar Donetsk	
Absolute difference	2,5664
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Lyon and Shakhtar Donetsk is	Not Different
Comparison between Salzburg and Rangers	
Absolute difference	73,8167
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Salzburg and Rangers is	Not Different
Comparison between Salzburg and Shakhtar Donetsk	
Absolute difference	65,6427
Standard error of the difference	54,62620764
Critical range	254,0118655
The average between Salzburg and Shakhtar Donetsk is	Not Different
Comparison between Rangers and Shakhtar Donetsk	
Absolute difference	8,174
Standard error of the difference	47,30768353
Critical range	219,9807284
The average between Rangers and Shakhtar Donetsk is	Not Different

Source: ANOVA data processing

Financial leverage. Financial leverage is the ratio of debt capital to equity capital: it expresses how dependent the company is on external sources. Financial leverage = (Debt capital/Equity capital) * 100. The data obtained by processing the balance sheet data are shown in Table 10.

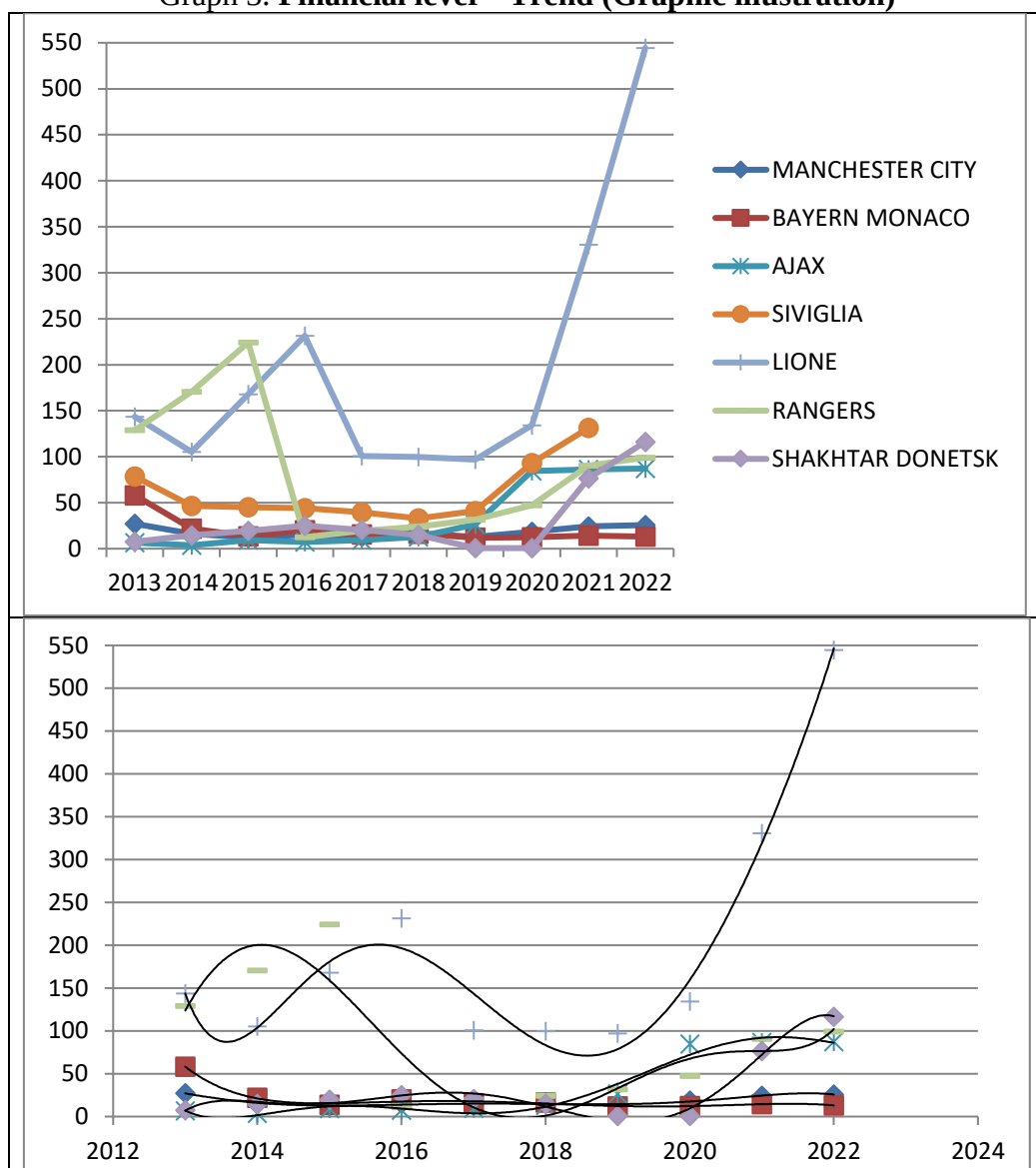
Table10. Financial Leverage -Trend (Data)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Manchester City	27,05	16,22	12,12	15,14	13,19	16,69	12,73	18,52	24,11	25,80
Bayern Munich	58,10	21,80	13,63	20,18	15,53	16,32	11,93	12,34	14,34	13,04
Juventus	505,5	681,4	624,7	611,9	467,8	611,2	1798	263,5	1925	231,8
Benfica	-1404	-4244	54407	1663	475,5	324,9	225,9	130,4	149,1	256,6
Ajax	6,43	3,70	9,33	7,16	9,48	12,79	26,39	84,49	86,28	87,14
Seville	78,50	46,43	45,23	43,92	39,58	32,90	41,09	93,10	131,2	
Lyon	143,7	105,2	167,91	231,3	100,8	99,64	96,84	134,1	330,6	544,4
Salzburg				4382	20,06	23,08	20,76	27,63	3,99	12,73
Rangers	129	170,6	224,12	12,49	19,26	23,97	31,61	47,18	90,48	99,02
Shakhtar Donetsk	7,46	14,37	19,53	24,95	20,45	14,91	0,76	0,61	76,46	116,2

Source: ORBIS Europe data processing

Manchester City, Bayern Munich, Ajax, Sevilla, Salzburg and Shakhtar Donetsk have a low dependency on external sources. On the other hand, Juventus, Benfica and Lyon are more indebted.

Graph 3. Financial lever - Trend (Graphic illustration)



Source: ORBIS Europe data processing.

Table 11 illustrates the equations required to obtain the interpolating trend curves and, with R2, their representative effectiveness.

Table 11. Financial leverage -Equations of interpolating curves

	Equation	R ²
Manchester City	$y = -0,003x^6 + 42,45x^5 - 21404x^4 + 6E+08x^3 - 9E+11x^2 + 7E+14x - 2E+17$	0,951
Bayern Munich	$y = 0,000x^6 - 11,18x^5 + 56557x^4 - 2E+08x^3 + 2E+11x^2 - 2E+14x + 6E+16$	0,989
Juventus	$y = -0,816x^6 + 9880,x^5 - 5E+07x^4 + 1E+11x^3 - 2E+14x^2 + 2E+17x - 6E+19$	0,386
Benfica	$y = 41,10x^6 - 49759x^5 + 3E+09x^4 - 7E+12x^3 + 1E+16x^2 - 8E+18x + 3E+21$	0,533
Ajax	$y = 0,017x^6 - 212,0x^5 + 1E+06x^4 - 3E+09x^3 + 4E+12x^2 - 4E+15x + 1E+18$	0,533
Seville	$y = -0,032x^6 + 392,2x^5 - 2E+06x^4 + 5E+09x^3 - 8E+12x^2 + 6E+15x - 2E+18$	0,969
Lyon	$y = 0,045x^6 - 551,1x^5 + 3E+06x^4 - 7E+09x^3 + 1E+13x^2 - 9E+15x + 3E+18$	0,997
Salzburg	$y = 6,383x^6 - 77342x^5 + 4E+08x^4 - 1E+12x^3 + 2E+15x^2 - 1E+18x + 4E+20$	1
Rangers	$y = 0,030x^6 - 372,9x^5 + 2E+06x^4 - 5E+09x^3 + 8E+12x^2 - 6E+15x + 2E+18$	0,782
Shakhtar Donetsk	$y = -0,038x^6 + 466,7x^5 - 2E+06x^4 + 6E+09x^3 - 1E+13x^2 + 8E+15x - 3E+18$	0,983

Source: ORBIS Europe data processing

This results in Graph 3, which shows the development of the index. The best representation forced the elimination of Benfica, Juventus, and Salzburg from the representation, with values that were excessively different from those of the other teams. The test for significant differences between the teams is carried out with the ANOVA test shown in Table 12.

Table 12. Financial Leverage - Anova Test

One-factor variance analysis						
SUMMARY						
Group	Count	Sum	Average	Variance		
Manchester City	10	181,57	18,157	30,96401		
Bayern Munich	10	197,218	19,721	192,4746		
Juventus	10	7721,668	772,1668	353239,18		
Benfica	10	51983,862	5198,386	30146076		
Ajax	10	333,203	33,3203	1357,4445		
Seville	9	551,909	61,3232	1083,279		
Lyon	10	1954,477	195,4477	20505,303		
Salzburg	7	4490,23	641,4614	2720624,4		
Rangers	10	847,684	84,7684	5158,3769		
Shakhtar Donetsk	10	295,689	29,5689	1389,6715		
ANALYSIS OF VARIANCE						
Group	SQ	dof	MQ	F	Significance value	F crit
Between groups	230629937,3	9	25625548	0,806390	0,61150068	1,990617
In groups	2732916148	86	31778094			
Total	2963546086	95				

Source: ORBIS Europe data processing

The leverage variance has an F-value of 0.80, lower than the F crit (1.99), indicating the absence of statistically significant differences. The Tukey Kramer test is, therefore, not necessary.

Conclusions. Soccer remains a central sport in the European and international landscape. This study has outlined the size and economic and financial performance of the leading European clubs, considering that the current legislation (Bastianon, 2015) rewards clubs that maintain an optimal economic-financial balance, incentivising strategic investments.

The analysis negates the H1 hypothesis: the best teams differ significantly in size concerning the number of employees. Teams from countries where the sport is more popular and generates higher turnover are larger. This, however, suggests that appreciable sporting results could probably also be achieved with more modest but effective and efficient organisations.

Hypothesis H2 is also not confirmed. Profitability is low and often negative, even though economic interests in soccer are significant. The highest profits are obtained from other related sources rather than from the general profitability of the clubs.

Consequently, hypothesis H3 must also be negated: self-financing policies with low profitability are complex; therefore, high recourse to external sources is necessary, even considering the modest capitalisation of the clubs.

There are statistically significant differences between some teams for Roe. In contrast, the differences are negligible for leverage: H4 can only be partially confirmed.

This study contributes to the literature on the economics of sports, mainly soccer, using quantitative methodologies that integrate aspects of effectiveness, efficiency and productivity (Guzmán and Morrow, 2007). However, the work is limited to analysing a sample of presumably unrepresentative European teams from the broader continental and international context.

However, sports entrepreneurs, especially in soccer, can benefit from the results of this study as a guide for their strategies. Managers of minor, semi-professional or amateur teams (Terrien et al., 2023) may also consider promoting growth-oriented economic and financial management in anticipation of future promotion to the higher leagues.

Furthermore, the findings may be helpful not only for soccer clubs but also for external stakeholders such as banks, consultants and trade unions, who can base their decisions on more in-depth and transparent economic analyses of the relationship between sport and business (Blumrodt et al., 2013; Breitbarth and Harris, 2008).

Future studies could extend the analysis to a larger sample and investigate relationships with other factors influencing sporting success, such as the geographic location of stadiums, the ownership of facilities, and the length of time teams stay in the top league. Furthermore, it would be helpful to integrate qualitative considerations, such as the harmony of the working environment and human capital characteristics.

Finally, soccer clubs should consider ethical and social responsibility implications, as soccer has a significant social and employment impact (Anagnostopoulos, 2013; Anagnostopoulos and Shilbury, 2013).

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