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PREDICTING FINANCIAL DISTRESS ACROSS SPANISH FOOTBALL (2018-2021): THE ADAPTIVE ROLE OF COMPETITION

PREVENDO A CRISE FINANCEIRA NO FUTEBOL ESPANHOL (2018-2021): O PAPEL ADAPTATIVO DA COMPETIÇÃO

PREDICCIÓN DE LA CRISIS FINANCIERA EN EL FÚTBOL ESPAÑOL (2018-2021): EL PAPEL ADAPTATIVO DE LA COMPETICIÓN

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Abstract
Objective: The objective is to analyze and compare the financial distress in football addressed to the first and second division.
Methodology: Initially, we calculated the comparative scores from models such as Altman (1968, 1983, 2000, 2016), Conan and Holder (1979), Springate (1978), Taffler (1982), and Zmijewski (1984). Subsequently, we applied factorial analysis to investigate the differences across the teams. Finally, we re-estimated the models for the data and contrasted the results.
Originality: This paper applies insolvency prediction models to Spanish football teams for the period 2018-2021 and compares the teams according to the division in which they participate.
Main Findings: The findings reveal that profitability and indebtedness are the main explanatory variables, highlighting the teams' lack of adaptation to shocks. Furthermore, the second-division teams exhibited better solvency and profitability than the first-tier clubs in the year following the pandemic outbreak.
Contributions: At a theoretical level, this research evaluates the adequacy of these models for this sector and underlines the need to constrain expenses during an exceptional period.

Keywords: Football. COVID-19. Finances. Spain. League.

Cite as

American Psychological Association (APA)

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Resumo:
Objetivo do estudo: O objetivo deste artigo é analisar e comparar a situação de crise financeira no futebol, com foco tanto na primeira quanto na segunda divisão
Metodologia/abordagem: Inicialmente, calculamos as pontuações comparativas de modelos como Altman (1968, 1983, 2000, 2016), Conan e Holder (1979), Springate (1978), Taffler (1982) e Zmijewski (1984). Posteriormente, aplicamos a análise fatorial para investigar as diferenças entre as equipes. Finalmente, reestimamos os modelos para os dados e contrastamos os resultados.
Originalidade/Relevância: As descobertas revelam que a rentabilidade e o endividamento são as principais variáveis explicativas, destacando a falta de adaptação das equipes aos choques. Além disso, as equipes de segunda divisão mostraram melhor solvência e rentabilidade do que os clubes de primeira divisão no ano seguinte ao surto da pandemia.
Principais resultados: Os resultados revelam que a lucratividade e a endividamento são as principais variáveis explicativas, destacando a falta de adaptação das equipes a choques. Além disso, os times da segunda divisão apresentaram melhor solvência e lucratividade do que os clubes da primeira divisão no ano seguinte ao surto da pandemia.
Contribuições teóricas/metodológicas: A nível teórico, esta pesquisa avalia a adequação desses modelos para este setor e sublinha a necessidade de restringir despesas durante um período excepcional.

Palavras-chave: Futebol. COVID-19. Finanças. Espanha. La Liga.

Resumen:
Objetivo: El objetivo de este artículo es analizar la crisis financiera entre 2018 y 2021 y destacar las diferencias entre los equipos de primera y segunda competición.
Metodología: Inicialmente, calculamos las puntuaciones comparativas de modelos como Altman (1968, 1983, 2000, 2016), Conan y Holder (1979), Springate (1978), Taffler (1982) y Zmijewski (1984). Posteriormente, aplicamos el análisis factorial para investigar las diferencias entre los equipos. Finalmente, reestimamos los modelos para los datos y contrastamos los resultados.
Originalidad: Este artículo aplica modelos de predicción de insolvencia a los equipos de fútbol españoles para el período 2018-2021 y compara los equipos según la competición en la que participan.
Principales hallazgos: Los hallazgos revelan que la rentabilidad y el endeudamiento son las principales variables explicativas, destacando la falta de adaptación de los equipos a los shocks. Además, los equipos de segunda división mostraron una mejor solvencia y rentabilidad que los clubes de primera división en el año siguiente al brote de la pandemia.
Contribuciones: A nivel teórico, esta investigación evalúa la adecuación de estos modelos para este sector y subraya la necesidad de limitar los gastos durante un período excepcional.

Palabras clave: Futbol. COVID-19. Finanzas. España. Liga.

Introduction

The global coronavirus pandemic has had a profound impact on the football industry. During the 2019/2020 season, football clubs remained open to the public until March 8, 2020, after which the season was suspended. The season concluded with stadiums closed until June 2020, and the division extended until July. Mobility restrictions persisted into the 2020/2021 season, with attendance limitations of 30%-40%. It was not until the 2021/2022 season that stadiums were allowed full capacity.

Before the outbreak, Spanish football clubs were considered financially healthy, thanks to UEFA's Financial Fair Play regulations and budget controls implemented by *La Liga* (the official division in Spain). However, after the closure of stadiums, club revenues significantly declined due to the absence of match-related income and the decrease in associated businesses, such as merchandising and advertising. By December 2020, Spain had the highest number of insolvencies among football competitions in Europe, yet it also recorded one of the highest recovery rates (Forner, 2020).

This extraordinary situation pushed entities to the brink, as their financial stability and revenues, including ticket sales, merchandise, and broadcasting, were indirectly impacted. Many Spanish football teams faced financial challenges, having to cover the costs of player salaries (the most significant expense), stadium maintenance, and other operational expenses. The economic uncertainty also affected sponsorships and commercial deals, leading some sponsors to reduce their financial commitments, renegotiate contracts, or withdraw altogether. The pandemic also had repercussions on player wages and transfers, as many teams had to reevaluate their spending, and player contracts were renegotiated to align with the financial constraints.

The competition's sponsorship was handled by La Liga (part of the Royal Spanish Football Federation) for the reference period, with the Spanish bank group Banco Santander, whose agreement was worth close to €20 million per year. Each club negotiated its own sponsorships, and the most important ones (Nike, Adidas) continued providing high quantities to the clubs during this period. The sponsorships were not affected by the pandemic situation; on the contrary, unlike other revenue sources, there was a slight increase, reaching 12% growth.

Since the advent of the pandemic in March 2020, La Liga clubs' squads have experienced a loss of €1.21 billion in market value, as per the valuations provided by the Transfermarkt

portal. In 2018, the total valuation of all players in the first division stood at €5.89 billion. However, this figure declined to €4.68 billion in 2021, representing a devaluation of 20%.

UEFA estimated the cumulative impact of the pandemic on different leagues. The Premier League had already accumulated losses of 2.083 billion euros, Serie A had 1,889 billion euros, and Ligue 1 had 1,356 billion euros. La Liga faced a deficit of 832 million euros, largely due to the restructuring undertaken by FC Barcelona, while the Bundesleague managed to contain its losses to 436 million euros.

This exceptional period highlights a critical research need within the field of insolvency prediction models, particularly in the context of professional sports. In December 2020, *Expansión* raised concerns about the alarming financial implications that a suspension of competition could have on clubs. The article noted that most organizations would struggle to comply with UEFA regulations during this period (Forner, 2020). While existing literature has extensively explored the application of insolvency prediction models, there remains a gap in understanding how unprecedented events like the Covid-19 pandemic impact the financial stability of sports organizations. This study seeks to fill that gap by applying established insolvency models (Z-Altman 1968, 1983, 2000, 2016; Conan & Holder 1978; Springate 1978;

Taffler 1982; Zmijewski 1984) to assess the unique financial challenges faced by La Liga clubs during and after the pandemic.

The remainder of this paper is organized into several sections. Initially, the Financial Fair Play regulations and the Spanish regulatory framework are examined, followed by a theoretical exploration of their effects on teams. The paper then elaborates on the methodology and

analysis employed. Subsequently, empirical evidence from the application of the models is presented, and an analysis of the changes in the primary financial characteristics before and after the crisis is conducted.

This study contributes to the existing literature by offering insights into the application of insolvency models to detect the impact of the Covid-19 crisis on the football industry. It focuses particularly on one of the most significant European leagues and analyzes how the crisis has altered the financial profiles of the clubs.

1 Background

The European football industry has grappled with chronic financial instability, exacerbated by prioritizing sporting success over economic evaluation. Traditionally, European clubs have prioritized winning over profit (Urdaneta et al., 2023). One possible reason for the poor financial performance of European football is that losses are, to some extent, voluntary. Evidence suggests that club owners' personal preferences often take precedence over financial examination, playing a significant role in sports clubs (Sloane, 1971; Demsetz & Lehn, 1985). This is more pronounced when considering the separation between ownership and control (Downward & Dawson, 2000).

Furthermore, the institutional environment plays a substantial role in explaining declining profits (Leach & Szymanski, 2015). It may be the case that clubs, especially the most prestigious ones, operate under the assumption that they will be rescued in the event of financial troubles, influencing their behavior. The paradox that only a few European professional football clubs go out of business, even though they operate on the brink of financial collapse (Storm & Nielsen, 2012), can only be explained by a soft budget constraint. Szymanski (2017) concludes that the hypercompetitive environment, due to the incentives of the promotion and relegation system, causes firms to generate negligible profits and remain perpetually close to insolvency. This suggests that incentives (utility vs. profit maximization) may play a secondary role in the financial performance of clubs. However, this may vary from league to league (Terrien & Andreff, 2020).

1.1 Financial fair play and spanish regulation

The Financial Fair Play (FFP) initiative introduced by UEFA in June 2010 aimed to enhance transparency and credibility within European football clubs (UEFA, 2022). UEFA requires that clubs provide audited financial statements and meet specific criteria: clubs cannot have overdue payables to their employees, other clubs, or social/tax authorities and are required to break even based on their relevant income and expenses. These requirements apply to teams participating in UEFA tournaments (Champions League and Europa League). In 2018, UEFA softened one of the restrictions, allowing clubs to exceed €5 million in spending not derived from their own revenues, with a limit that can increase to €30 million with €25 million from capital injections. Due to pressure from larger clubs, this threshold has been raised to €100 million. Controlled expenses encompass player salaries (constituting approximately 70% of the

entities' budget) and squad costs but exclude subsidiary expenses, youth academies, or stadium and infrastructure investments (Rodríguez-Ponga & Gutiérrez-Bolivar, 2019).

Non-compliance with FFP regulations results in various sanctions, ranging from warnings, reprimands, or fines to the withdrawal of titles or prize money (though the latter has not been imposed). Intermediate sanctions such as point deductions, withholding income from European competitions, or restrictions on registering new players may also be applied.

The global pandemic prompted UEFA to adopt temporary emergency measures, considering the financial years 2020 and 2021 as a single period. In April 2022, new financial rules were approved and came into effect in the 2022/2023 season, implementing a gradual three-year adaptation process for entities.

In Spain, the official division (La Liga) has implemented a control system similar to UEFA's FFP. Initiated in 2011 but applied from the 2013-2014 season onwards, this system analyzes accounts retrospectively. Recognizing its insufficiency, La Liga introduced budgeting regulations to guarantee prior control, limiting teams' capacity to hire new players or offer salaries. This is applicable only to the registrable staff, encompassing players, trainers, technicians, and other contracted individuals (Liga de Futbol Profesional, 2018). The law requires significant financial information disclosure by clubs, aiming for transparency in economic matters. The distribution of television revenues is regulated by the Control Body for the Management of Audiovisual Rights, seeking fairness. The Union of European Football Associations' financial control rules and the 2014 Economic Control Regulations by the Professional Football League further enhance information requirements. Clubs must submit audited annual accounts, promoting economic and financial improvement, creditor protection, and responsible spending.

1.2 Effects of Financial Fair Play (FFP)

These regulations have profoundly impacted the financial landscape of European football clubs. Previous research findings have been contradictory. Several authors have evaluated the effects of FFP clearly positive. Serrano et al. (2023) conducted a study comparing 2011 (the first year of FFP implementation) and 2017, revealing a significant improvement. The positive shift in profitability was particularly notable in the Spanish, English, and German leagues (Ahtiainen and Jarva, 2022). However, this impact varied within leagues, occurring where strict local codes complemented FFP regulations. In the same vein, Fernández-Vilariño and

Domínguez (2022) outlined that the effects of the controls by La Liga produced positive outcomes for economic performance and financial sustainability and aligned economic practices with ethical and sustainable principles in professional football. Urdaneta (2023) assessed that these regulations improved clubs' economic situations, contributing to the overall positive trend in the professional competition industry. Ghio et al. (2019) observed that FFP aimed to reduce cost inefficiencies among clubs, penalizing those exceeding income-to-expense ratios. This encouraged a more balanced relationship between financial and sporting performance, albeit with differing opinions on this equilibrium. Nicoliello and Zampatti (2016) argued that FFP altered business decisions, emphasizing income-expense equilibrium.

Nevertheless, other studies have argued that FFP has had negative effects. Dimitropoulos and Koronios (2018) believed it encouraged short-term perspectives, potentially compromising accounting quality. Plumley et al. (2017) investigated the impact of "too big to fail" in English football leagues, revealing that major clubs exhibited a comparatively better financial situation after the regulation. However, concerns were raised about the quality of accounting information, potentially leading to unfavorable auditor opinions in extreme cases.

1.3 Financial distress

Financial distress is a prevalent issue among football clubs, marked by declining revenues, high administrative costs, and solvency challenges (Cordery et al., 2013). Various models, with the Z-Altman's score has been widely employed to assess financial distress. Plumley et al. (2017) analyzed Z scores before and after the implementation of Financial Fair Play for English teams, finding that larger clubs generally exhibit better financial health, but overall financial stability remains poor in English and Championship competitions. It also noteworthy, the study by Gerdin & Rump (2017) who found that for a sample of European teams, even surviving clubs often exhibited negative equity.

In analyzing team failures, the causes of financial failure appear to be dependent on the country of reference and the period. In the English competition, Szymanski (2012, 2017) pointed to a financial crisis caused by excessive spending and owners attempting unsustainable improvements in league position from 1974 to 2021 and Plumley et al. (2017) concluded that while main clubs had better financial situations, the overall financial situation was quite poor. Other investigations, such as those by Scelles et al. (2018) for the French competition, and Szymanski and Weimar (2019) for German teams, highlighted the negative effects of random

shocks resulting from deviations between actual and expected team performance. Additional investigations have focused on countries like Denmark (Storm and Thomsen, 2016) recommending clubs stick to core activities, the Netherlands (Gerritsen, 2015), and Poland (Perechuda, 2020).

Previous research has also utilized the Z model in Spain; for example, Barajas and Rodríguez (2014) concluded the need for increased equity, higher income, and reduced costs in Spanish clubs to improve the financial situation of football teams. Alaminos et al. (2020) identified liquidity, leverage, and sports performance as important factors, and García-del-Barrio and Szymanski (2009) highlighted the need for budget-consciousness among second division Spanish football teams. These findings provide valuable insights into the financial challenges and strategies prevalent in football clubs.

Finally, in some cases the investigation has focused only on some teams, like Ika et al. (2021) who used Z-score Altman, Springate, and Zmijewski to assess the performance of Arsenal and Manchester City.

In the context of the Spanish competition, Ascari and Gagnepain (2006) emphasized the traditionally poor financial situation of Spanish football, a trend that mirrors the financial conditions of the Italian and English leagues, as noted by Boscá et al. (2008). This financial instability was further elaborated by Barajas and Rodríguez (2014), who provided an outline of the financial difficulties faced by Spanish clubs from 2007 to 2011 and proposed potential solutions. Despite these challenges, Fernández Vilarino and Domínguez-Gómez (2022) observed a growth in key revenue indicators in 2015/2016, which was attributed to increased match attendance and a larger number of matches played. However, Gutiérrez-Fernández et al. (2017) found that most Spanish clubs continue to struggle with controlling their financial status, primarily due to poor management and failure to achieve objectives.

2 Research questions

Considering this evidence, we formulate the following research questions:

Research Question 1: How has the COVID-19 pandemic impacted the solvency of teams in Spanish divisions?

To answer this question, we tested common insolvency models, specifically Altman's models (1968, 2000, and 2016), Conan and Holder's (1979), Springate's (1978), Taffler's (1982), and Zimjewski's (1984). Comparing indicators will help detect if risk scores deteriorated

due to the crisis Furthermore, it is intended to investigate the causes of financial weakness during this tumultuous period. Our interest lies not in the competitive accuracy of one model over another but in achieving consistent results.

Research Question 2: Is there a difference in the financial profile of divisions before and after the crisis?

This question will be addressed through factorial analysis between the years before the crisis, the year of the outbreak, and the year following it. Variables for this analysis are extracted from each model.

Both questions emphasize that the focus is not the individual teams. Our objective is not to analyze the scores or the probability of insolvency for each entity.

3 Methodology

The first question is addressed by calculating the scores of the most common methods. In our case, we applied Z Altman (1968, 2000, 2016), Conan and Holder (1979), Springate (1978), Taffler (1982), and Zmijewski (1984). Additionally, we regressed the scores with the whole ratios to investigate the validity of the original formulations, selecting the significant ratios using appropriate techniques.

Following Barbuta-Misu and Madaleno (2020), these models have appeared in most of the recent studies where bankruptcy models are tested and demonstrate high accuracy (with original statistical techniques yielding accuracy rates of 80.6%, 93.8%, and 95.3% for Altman (1968), Ohlson (1980), and Zmijewski (1984), respectively) (Table 1)

Table 1.

The Most Used Models In Bankruptcy Prediction: Formalization Of The Models

Model	Formula
Altman (1968)	*Z= 1.2 WCTA +1.4 RETA* +3.3 EBTA +0.6 MEBD** + 1 STA*
Altman (1983)	*Z = 0.717 WCTA + 0.847 RETA* + 3.107 EBTA + 0.420 NWTD +0.998 STA*
Altman revised (1983)	*Z = 3.25 + 6.56 WCTA + 3.26 RETA* + 6.72 EBTA + 1.05 NWTD*
Altman (2016)	*Z (probabilitiy) = -0.042 -0,561WCTA -0.724 RETA* -1.791EBTA -0.021 NWTD*
Conan and Holder (1979)	*Z= 0.24 GOTD + 0.22 PCTL + 0.16 CSTL -0,87 FETS -0,10 PEAV*
Springate (1978)	*Z = 1.03 WCTA + 3.07 EBTA + 0.66EBCL+0.4 STA*
Taffler (1982)	*Z = 3.2 +12.18 EBCL + 2.5 CATL -10.68 CLTA + 0.029 QADO*
Zmijewski (1984)	*Z= -4.336 – 4.513 NITA + 5.679 TLTA + 0.004 CACL*

*The original formulation is retained earnings to total assets.
**market value equity to book value of total debt.
Source: Table 1 is the author's own work.

Following, we selected the variables based on the insolvency risk models used (Table 2). As no Spanish team quotes in a financial market, two ratios have not been possible to compute: the book value of principal to book value of total debt and the market equity to book debt (Altma1968). Among the ratios utilized by the models, the majority are related to liquidity and efficiency. This suggests that the primary indicators of future insolvency are those measuring an entity's ability to maintain cash and other assets that can be easily converted into cash for short-term debt payment. Closely related to this is the second determinant of insolvency, efficiency, which assesses how effectively a company utilizes its assets and liabilities to generate sales and maximize profits. Although the scores of the insolvency models can serve as a proxy for insolvency, they are not conclusive because the teams may have been in a worse situation than indicated by the obtained solvency index.

Table 2.

The Variables Used In The Models According To The Author

Ratio		Measure	Model used
CACL	Current ratio: Current Assets/ Current Liabilities	Liquidity	Zmijewski (1984)
CATL	Current Assets / Total Liabilities	Liquidity	Taffler (1982)
CLTA	Current Liabilities/ Total Assets	Liquidity	Taffler (1982)
CSTL	Acid-test ratio: (Current Assets- Stocks)/ Total Liabilities	Liquidity	Conan and Holder (1979)
EBCL	Earnings before Taxes / Current Liabilities	Leverage	Springate (1978) Taffler (1982)
EBTA	Operating return on assets: Earnings before Interest and Taxes (EBIT) / Total Assets	Profitability	Altman (1968, 1983, 2016), Springate (1978)
FETS	Financial Expenditures/ Net Sales	Coverage	Conan and Holder (1979)
GOTD	Gross Operating Surplus/ Total Debt	Coverage	Conan and Holder (1979)
NITA	Return on Assets: Net Income / Total Assets	Profitability	Zmijewski (1984)
NWTD	Debt to equity ratio: Net Worth/ Total Debt	Solvency	Altman (1983, 2016)
PCTL	Permanent Capitals / Net Worth and Liabilities	Solvency	Conan and Holder (1979)
PEAV	Personnel Expenditures/ Added Value	Efficiency	Conan and Holder (1979)
QADO	(Quick Assets - Current Liabilities) / Daily Operating Expenses	Efficiency	Conan and Holder (1979) Taffler (1982)
RETA	Retained Earnings before Interest and Taxes/ Total Assets	Efficiency	Altman (1968, 1983, 2016), Springate (1978)
STA	Asset turnover ratio: Sales / Total Assets	Efficiency	Altman (1968, 1983), Springate (1978)
TLTA	Debt Ratio: Total liabilities / Total Assets	Leverage	Zmijewski (1984)
WCTA	Working Capital / Total Assets	Liquidity	Altman (1968, 1983, 2016), Springate (1978)

Source: Table 2 is the author's own work.

The following step has been to investigate the main financial characteristics of the teams (research question 2). We used principal component analysis and factorial analysis based on the initial variables with the aim at identifying the common characteristics that led clubs to financial distress and identify the differences between the divisions.

3.1 Sample

The financial data was extracted from the Iberian Balance Analysis System (SABI), but some teams did not have complete information in SABI. In one case, no data were available for 2019. Our criterion was to include all the entities that played in the first and second divisions from 2018 (season 2018-2019) to 2021 (season 2021-2022) (Table 3). The number of teams in the first division was 20, and in the second, it was 22. Membership in the first or second division changed for each season during the period studied, according to the sport results.

Table 3.

First And Second Division Teams

TEAM	DIVISION	TEAM	DIVISION
BARCELONA	1	ALMERIA	2
BILBAO	1	MIRANDES	2
ESPANYOL	1	CADIZ	2
REAL SOCIEDAD	1	ELCHE	2
EIBAR	1	GIRONA	2
GETAFE	1	HUESCA	2
GRANADA	1	PONFERRADINA	2
ATLETICO DE MADRID	1	LUGO	2
LEGANES	1	RAYO VALLECANO	2
REAL MADRID	1	MALAGA	2
MALLORCA	1	OVIEDO	2
BETIS	1	GIJON	2
SEVILLA	1	LAS PALMAS	2
VALENCIA	1	TENERIFE	2
VILLARREAL	1	ZARAGOZA	2
ALAVES	1	FUENLABRADA	2
VALLADOLID	1	ALCORCON	2
OSASUNA	1	ALBACETE	2
LEVANTE	1	EXTREMADURA	2
CELTA	1	NUMANCIA	2
		A CORUÑA	2
		SANTANDER	2

Source: Table 3 is the author's own work.

Data was collected from this database to calculate the ratios utilized by the insolvency prediction models (Table 2). As it can be seen, liquidity is represented by four ratios (CACL, CATL, CLTA, WCTA), and efficiency is represented by four ratios (PEAV, QADO, RETA, STA). The remaining ratios represent leverage, profitability, and solvency. This methodology has been applied in the studies that compare the performance of different insolvency prediction models (for instance, Barbuta-Misu and Madaleno (2020) or Shi and Li (2019) among others).

4 Descriptive analysis

The descriptive analysis is provided in Table 4. Focusing on the median values, the results reveal several key findings. Throughout all observed periods, both working capital and retained earnings consistently remained negative. This trend underlines the financial difficulties these entities faced in terms of liquidity and profitability, both before and after the pandemic.

Interestingly, this contrasts with the ratio of net worth to total debt, which remained above one throughout the entire period. Specifically, it was 5.2662 in 2018/19 and peaked at 8.4332 in 2021/22.

Another notable observation is the ratio of personnel expenditures to added value. In 2018/19, it was 81.46%. However, this proportion has been increasing, reaching 1.03 in 2021/22. This suggests that personnel expenditures are likely to continue rising, despite the ongoing pandemic.

5 Application of insolvency prediction models

Table 5 presents the outcomes from the application of various models to the entire competition and to each individual division. To address the first research question, we concentrate on the evolution for the whole sample. We distinguish between the results derived from models calculated by Altman et al. (1968, 1983, 2000, 2016) and those calculated by other authors.

The results reveal a divergent progression of scores for the whole sample, with each model yielding different outcomes and indicating various trajectories. The Z (1968) score for the entire competition exhibit a positive trend, however, the Z (1983) and Z (2000) models display an opposing trend: a negative progression. Considering that Altman (2016) provides the probability of insolvency, the results indicate that this probability has increased during this period. In comparison with the other models (Conan and Holder, 1979; Springate, 1978) the

results suggest that the evolution is relatively stable but declines in the final study period (2021-2022). In the case of Taffler (1982) and Zmijewski (1984) models demonstrate a trend that is distinctly different from the rest.

Based on our analysis, we can address the first research question. For most of the scores calculated, the pandemic has worsened the financial situation of Spanish clubs, escalating the risk of insolvency as the number of entities at risk has significantly increased

Table 4.

Descriptive Analysis of The Ratios: Mean, Median, And Standard Deviation From 2018/2019 To 2021/2022

Season	**2018/2019**				**2019/2020**				**2020/2021**				**2021/2022**			
Ratio	N	Mean	Median	Standard deviation	N	Mean	Median	Standard deviation	N	Mean	Median	Standard deviation	N	Mean	Median	Standard deviation
WCTA	45	-0.2608	-0.1455	0.8035	46	-0.1798	-0.1175	0.5196	42	-0.8815	-0.4457	1.4822	33	-1.2317	-0.5117	2.3090
RETA	45	-0.0251	0.0229	0.3623	46	-0.0123	0.0194	0.2859	42	-0.0002	0.0040	0.1731	33	-0.0994	-0.0554	0.1824
EBTA	38	0.0766	0.0556	0.1631	45	0.0429	0.0476	0.2579	41	0.03410	0.0270	0.1183	33	-0.0743	-0.0290	0.1742
NWTD	31	5.2662	1.3974	1.5043	32	2.1161	1.2140	4.1907	39	7.7810	1.7404	1.3917	29	8.4332	2.5381	18.9830
STA	45	0.6628	0.6340	0.4032	46	0.6406	0.5553	0.3910	42	0.5376	0.4795	0.2980	33	0.6164	0.5217	0.3992
GOTD	46	0.1599	0.0428	03625	44	0.0480	0.0497	0.5099	40	0.0860	0.0100	0.3708	33	-4.068	-0,0970	2.2907
PCTL	46	0.1729	-0.2189	1.6251	44	1.0048	0.8493	1.2150	40	1.3357	1.0211	1.5865	33	1.2277	0.9250	1.5214
CSTL	44	0.7927	0.3870	1.6681	44	0.6721	0.3629	0.9215	40	0.8211	0.3779	1.1173	33	0.6821	0.3597	1.0315
FETS	46	0.03841	0.0129	0.0698	45	0.0366	0.0117	0.0690	41	0.0257	0.0090	0.0356	33	0.0314	0.0101	0.0540
PEAV	36	0.8146	0.7373	0.2706	37	0.8090	0.7037	0.3083	39	0.7804	0.7162	0.2629	33	1.0358	0.8249	0.6677
EBCL	37	0.2462	0.0932	0.6363	38	0.0990	0.1094	0.7025	38	0.1493	0.0141	0.3945	33	-0.2066	-0.1114	0.5642
CATL	46	0.7765	0.387	1.632	44	0.7321	0.3876	0.9436	40	0.8265	0.3774	1.1142	33	0.6821	0.3597	1.0313
CLTA	46	0.6043	0.4131	0.7671	44	0.5126	0.3981	0.5340	41	0.4529	0.3775	0.3779	33	0.4167	0.3921	0.2229
QUADO	46	1.8000	-1.5857	1.3138	45	-5.1398	-4.0822	3.4094	41	-2.4843	-1.057	1.0532	33	-3.079	-6.633	6.6951
NITA	45	-0.0248	0.2295	0.3624	46	-0.0142	0.0194	0.2851	42	-0.0037	0.0040	0.1730	33	0.7917	0.6731	0.7286
TLTA	46	1.3320	0.6805	2.9837	46	0.97	0.6315	1.2302	42	0.7356	0.5669	0.6666	33	0.7917	0.6713	0.7286
CACL	46	1.3401	0.5935	3.1297	47	1.032	0.6432	1.1523	42	1.1243	0.6975	1.2549	33	1.0413	0.6168	1.2016

Source: Table 4 is the author's own work.

With respect to the second research question, our preliminary analysis of the findings primarily concentrates on Altman's models, followed by an examination of the remaining models. It is evident from Altman's models that each division displays divergent scores and trends. When we separate the trend of the first division from the second, it becomes apparent that the crisis in the lower division began in 2019-2020, while in the first division, it started in 2020-2021 (a year later). While the shock of the pandemic could be a contributing factor, the closure of stadiums was a common occurrence for both tournaments. The disparities may arise from the fact that in the first division, the revenue from television rights is more substantial than in the second. This could serve as a significant factor in explaining the differential impact. The Altman et al. (2016) model deserves separate consideration due to its representation of the probability of insolvency, showing an upward trend regardless of the club's division. However, in line with previous results, the probability is higher for the first division than the second.

Moving on each division, both leagues experienced a decline in the Altman's models, with a particularly pronounced drop in the lower division for the period 2019-2020. The subsequent period, influenced by the pandemic (2020-2021) had negative effects on the first division, as indicated by the deterioration in the model results. In contrast, the second division showed improved performance. This outcome is supported by the data presented in the graph at the bottom of Table 4, where the Altman Z-scores reveal an improvement in the second division, while the trend for the first division is negative.

The remaining models exhibit similar trends for the first versus the second division. It is straightforward to observe how the models of Conan and Holder (1979) or Springate (1978) display similar evolution graphs. Consequently, it appears that these differences diminish depending on the model.

6 Financial characteristics of the teams

To address the second research question regarding changes in the financial profile of entities before and after the crisis, we employed factorial analysis of the main components. The objective was to explore how the profile of these entities has evolved from one year to the next and how the pandemic has influenced their financial characteristics.

The selected main components are those with eigenvalues exceeding 1. For the pre-COVID period, principal component analysis (rotating the axes) was applied, and the most correlated ratios with each component were chosen (Table 6). In the 2018/2019 season,

profitability emerged as the primary factor explaining the variation among entities, followed by the coverage of current liabilities and capitalization. Turnover and short-term solvency were positioned in the fourth and fifth principal components. The results highlighted the insufficient capitalization of football clubs, as noted in prior literature (Barajas and Rodríguez, 2014; Fernández-Vilarino and Domínguez-Gómez, 2022).

Table 5.

Results From The Application of Insolvency Models For The Seasons 2018-2019 Through 2021-2022

	Z 1968			Z 1983			Z 2000			ALTMAN 2016		
	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION
2018-2019	-2.73	2.43	6.69	2.45	2.02	5.76	7.23	5.96	16.44	0.2	0.34	0.38
2019-2020	1.55	2.07	1.49	1.25	1.4	1.11	4.48	4.55	4.44	0.08	0.29	0.18
2020-2021	3.81	5.64	1.27	3.32	4.42	1.63	5.09	7.44	1.96	0.21	0.21	0.16
2021-2022	3.72	3.45	5.84	2.67	2.57	2.26	2.38	-0.36	2.27	0.61	0.9	0.32
MINIGRAPH												

	CONAN AND HOLDER (1979)			SPRINGATE (1978)			TAFFLER (1982)			ZMIJEWSKI (1984)		
	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION	WHOLE	FIRST DIVISION	SECOND DIVISION
2018-2019	0.1	0.06	0.01	0.29	0.74	0.16	-0.25	-5.59	2.29	2.46	-0.1	6.25
2019-2020	0.24	0.27	0.24	0.26	0.74	0.4	-2.44	-1.74	5.58	0.6	-0.66	0.84
2020-2021	0.25	0.25	0.28	0.23	0.37	0.22	-0.19	2.92	3.35	-0.9	-1.29	-0.96
2021-2022	-0.46	0.16	0.21	-0.16	-0.08	-0.16	4.74	1.44	10.25	-0.8	1.09	-2.36
MINIGRAPH												

Source: Table 5 is the author's own work.

Table 6.

Factorial Analysis (Principal Component Analysis) From 2018/2019 To 2021/2022

Season					**First division**				**Second division**			
	PC	Ratio	Meaning	% Explained	Principal component	Ratio	Meaning	% explained	Principal component	Ratio	Meaning	% explained
2018 / 2019	1	*RETA*	Profitability	33.92	1	NITA	Profitability	37.24	1	NITA	Profitability	44.38
	2	*EBCL*	Coverage current liablities	53.56	2	EBTA	Profitability	62.35	2	CLTA	Short-term liabilities	59.84
	3	*PCTL*	Capitalization	65.73	3	CSTL	Liquidity	72.90	3	CACL	Short-term solvency	72.12
	4	*STA*	Turnover	74.97	4	TLTA	indebtedness	81.18	4	EBCL	Coverage	82.95
	5	*CACL*	Short-term solvency	82.47					5	CLTA	Short-term liabilities	90.09
2019/2020	1	*TLTA*	Indebtedness	28.21	1	TLTA	Indebtedness	32.09	1	NITA	Profitability	27.73
	2	*PCTL*	Capitalization	43.99	2	STA	Turnover	52.48	2	EBTA	Profitability	49.51
	3	*QADO*	Liquidity	58.37	3	FETS	Financial expenses	67.29	3	QADO	Liquidity	66.74
	4	*STA*	Turnover	68.59	4	CATL	Coverage	80.30	4	EBCL	Coverage	77.12
	5	*CACL*	Short-term solvency	76.37	5	EBCL	Coverage	87.72	5	CLTA	Short-term indebtedness	83.49
2020/2021	1	*TLTA*	Indebtedness	34.16	1	NITA	Profitability	43.88	1	QADO	Liquidity	33.69

Season					First division				Second division			
	2	*CACL*	Short-term solvency	50.34	2	NWTD	Coverage	61.71	2	NITA	Profitability	57.15
	3	*EBTA*	Profitability	67.92	3	QADO	Liquidity	73.76	3	EBCL	Coverage	72.91
	4	*STA*	Turnover	73.71	4	CSTL	Liquidity	82.62	4	FETS	Financial expenses	84.84
					5	STA	Turnover	89.94	5	EBCL	Coverage	93.26
2021/2022	1	*RETA*	Profitability	32.89	1	TLTA	Indebtedness	32.64	1	EBTA	Profitability	42.64
	2	*CSTL*	Short-term solvency	46.70	2	QADO	Liquidity	57.56	2	PCTL	Permanent capitals	68.35
	3	*QADO*	Liquidity	59.50	3	EBTA	Profitability	75.28	3	CATL	Liquidity	84.11
	4	*EBCL*	Short-term coverage	70.48	4	FETS	Financial expenditures	87.82	4	NWTD	Coverage	95.21
	5	*WCTA*	Short-term solvency	79.38	5	PCTL	Permanent capitals	94.28	5	GOTD		
	6	*STA*	Turnover	86.47								

*Percentage of dispersion explained by components with eigenvalue>1.
Source: Table 6 is the author's own work.

The subsequent season (2019/2020) retained some characteristics from 2018/2019, including capitalization, turnover, and short-term solvency. However, indebtedness became the first component, explaining 28% of the variability, while short-term solvency shifted to the fifth position. Thus, before the pandemic, five factors explained the financial characteristics of Spanish football teams, with profitability and indebtedness being the most explanatory components.

In 2020-2021, indebtedness was the most influential characteristic in the pandemic's onset, with short-term solvency ranking second. The number of components reduced to four, with the explanatory percentage at its lowest (73%). This outcome suggests the imperative need for debt when teams lacked revenues and had to cover expenses during the pandemic.

The 2021-2022 season presented a distinct perspective. The number of principal components expanded to six, with profitability and short-term solvency being the primary ones. It appears that after the pandemic-induced shock, the situation returned to patterns observed in previous years.

While the factors explaining the dispersion and financial characteristics of the first and second divisions shared some common elements, distinctions were also evident. Profitability (NITA or EBTA) consistently stood out as the most prominent financial characteristic in both cases and most years. In the first division, it was the most explanatory in 2018/2019 and 2020/2021. However, noteworthy differences emerged, such as in the 2019/2020 season, where indebtedness was the primary component for the first division, while profitability took precedence for the second. In 2020/2021, profitability remained important for the first division, while QADO became prominent in the second division, which is related to efficiency. The crisis significantly impacted the profitability of the first division clubs, whereas liquidity emerged as a major concern for the second division. Furthermore, the coverage of total debt (NWTD) ranked second in importance for the first division, whereas profitability occupied that position for the second division. Finally, in the 2021/2022 season, a distinct profile was observed for each division, with indebtedness (TLTA) being the primary determinant for the first division and profitability (EBTA) for the second.

Finally, the financial determinants for both initial and subsequent competitions exhibit similarities, with profitability consistently emerging as a steadfast and indispensable factor each year. However, noticeable distinctions arise post-crisis, where teams in the first division faced challenges linked to elevated levels of indebtedness and precarious liquidity conditions preceding the pandemic. The interruption of the competition, coupled with a subsequent decline

in revenues exacerbated by increased expenditure—particularly in player salaries—aggravated the already precarious financial predicament.

7 Re-estimation of the models

To assess the robustness of the models, we conducted regressions using the scores of each model (zeta scores) as dependent variables and included all ratios from Table 2 as independent variables. Our approach involved initiating the analysis with all variables and subsequently eliminating those that exhibited significant correlations. Subsequently, we employed a stepwise regression to select only the pertinent ratios. These results facilitate the comparison of factors across models for each year and allow for a contrasting view of the pre- and post-pandemic situations.

The original ratios in each model may differ from those selected in these regressions. This divergence can be attributed to our methodology, wherein we initially regressed the values of each index (dependent variable) against all variables used in different models and then applied a backward process. While this does not undermine the original results using the variables, it stresses the necessity for model updates when utilizing them. Nonetheless, it should be emphasized that the R^2 values are consistently high in almost all cases. Taken collectively, these findings indicate that COVID-19 has altered the financial determinants influencing the positions of football teams.

Table 7 presents the outcomes, delineating the significant variables for each model and year. Notably, certain ratios recur across models in each year. Upon closer examination, turnover (STA), coverage of short-term debt (EBCL), and coverage of total debt (NWTD) exhibit positive associations with the sign of most models. Moreover, liquidity (CACL) appears in 2018-2019, and profitability (NITA) in 2019-2020. The impact of the pandemic on financial indicators is evident in 2020-2021 and 2021-2022, where turnover (STA) and profitability (NITA) emerge as key factors. Intriguingly, the number of meaningful ratios increases each year, particularly in 2021-2022. A comparison of results between 2018-2019 and 2020-2021 reveals the absence of indebtedness in the latter. The crisis appears to concentrate on turnover and profitability as defining factors for entities during this period.

Table 7.

Re-Estimation of The Models Using The Principal Component Significant Variable

	Z196	R2	Z983	R2	Z1983R	.R2	Z0216	R2	Conan	R2	Springate	R2	Taffler	R2	Zmijewski	R2
2018/2019	*Z=-0.55 + 0.37CACL** + 1.31STA** +0.6NWTD***	*0.99**	*Z= -0.44+0.21CACL** +1.36STA**+0.42 NWTD****	*0.99**	*Z=2.22+ 1.52CACL**- 1.37PEAV+1.05NWTD****	*0.99**	*Z=0.27-0.16CACL**-0.22STA- 0.02NWTD****	*0.88**	*Z= 0.28-0.38PEAV** - 2.44FETS**+0.01 NWTD****	*0.81**	*Z= -0.18 +0.13CACL + 5.83FETS*+2.63 EBCL****	*0.94**	*Z= -0.76-4.84 STA* + 2.86 PEAV + 0.02 QADO**+ 17.20 EBCL****	*0.99**	*Z=-3.29+6.36STA** - 3.07EBCL**	*0.79**
2019/2020	*-0.13 + 1.51 STA** + 0,43 EBCL* + 2.20 NITA +0.44 NWTD****	*0.99**	*Z= -0.15 + 0.14 EBCL + 1.32 STA** + 3.44 NITA** + 0.39 NWTD****	*0.98**	*Z= 0.27 + 2.66 CLTA* -7.68 FETS -0.43 PCTL + 1.20 NWTD** + 3.41 STA****	*0.93**	*Z= 0.19-0.19 CLTA – 0,31 STA**-1.5 NITA** -0.11 EBCL*	*0.79**	*Z= 0.24 +0.23STA -1.96FETS+ 0.31NITA + 0.34PCTL** - 0.53PEAV*	*84.99**	*Z= 0.54 -1CLTA + 2.48 EBCL** + 2.87 NITA - 0.04NWTD*	*0.96**	*Z= 1.63 -3.9 CLTA** + 2.42 EBCL** -6.8 NITA****	*0.87**	*Z=-3.69 +7.83 CLTA** + 4.028 FETS* - 0.21NWTD*	*0.80**
2020/2021	*Z= -2.42 + 0.28 CATL -*	*0.98**	*Z=-1.83 + 1.33 PEAV + 7.92 NITA** + 0.45 NWTD** -0.95 TLTA** + 2.04*	*0.99**	*Z= -1.45 +1.3 PEAV + 4.4 NITA* + 1.4 NWTD** -0.9 TLTA** + 0.9*	*0.9458**	*Z= 1.42 - 1.07 PEAV – 5.57*	*0.86*	*Z= 0.54 + 0.35 PCTL** -1.12 NITA -0.82 PEAV**	*0.9196*	*Z =0.33 + 0.145 CATL + 1.30 EBCL** – 0.34 TLTA**	*0.7968*	*Z= 0.72 + 6.23 CATL** -1.35*	*0.8711*	*Z= -4.33 - 4.49 NITA** + 5.67*	*0.99*

	*1.33 TLTA** + 0.65NWTD** +3.62 STA**		*STA**		*STA**		*NITA** -0.05 NWTD** + 0.75 TLTA** -0.82 STA**						*TLTA** +1.81 EBCL**		*TLTA**	
2021/2022	*Z=0.09 +1.25 WCTA** - 0.32 CLTA* + 1.11 STA** - 0.62 NITA** + 0.59 NWTD** - 0.31 EBCL**	*0.99**	*Z= 1.82 -0.26 CATL** -0.82 CLTA -0.01 GOTD** + 5.71 NITA** + 0.31 NWTD** + 0.51 EBCL** + 0.34 PCTL** + 0.86 WCTA**	*0.99**	*Z=1.90 -2.21 CATL* -6.80 CLTA -0.01 GOTD** +2.19 NITA** + 4.97 EBCL* + 3 PCTL** -8.93 STA** + 7.42 WCTA**	*0.98**	*Z= -0.3 + 0.04 CATL* – 0.56 WCTA** – 2.75 NITA** -0.15 EBCL** – 0.07 PCTL** + 0.14 STA**	*0.99*	*Z=-0.05 + 0.38 PCTL** -0.16 STA + 0.24 GOTD** + 0.35 NITA**	*0.99*	*Z=4.34 NITA** + 0.84 EBCL + 0.20 PCTL	*0.59**	*Z= -2.88 + 2 CATLl - 1.91 CLTA** + 1.5 EBCL**– 1.15 NITA**	*0.98**	*Z= 0.44 - 0.79 PCTL - 1.94 NITA** + 3.33 EBCL**	*0.8094*

*significant at 5%; ** significant at 1%

Source: Table 7 is the author's own work.

These results highlight two variables, profitability, and turnover, that consistently appear across most models. Indebtedness, on the other hand, does not seem to play a significant role in this period. Furthermore, most of the models demonstrate significance and relevance, proving their utility in assessing financial dynamics.

8 Discussion

Insolvency prediction models have produced varying outcomes depending on the calculated scores. Across all models, there is a noticeable decline in financial standings, particularly highlighted in 2020. Consistent with previous research, liquidity, along with profitability, emerges as an important factor shaping the financial landscape of football teams. However, it could be argued that all businesses rely on sound liquidity, structure, and curtailing expenditures to survive in deteriorating situations. What makes football in Spain unique is that, although the shock provoked by the pandemic deteriorated their financial situation, it did not necessarily imply that certain expenditures, such as football player salaries, were affected. In fact, the later situation of Barcelona F.C. was partially explained by the high salaries of the squad. Another difference is the support that football clubs receive from immediate stakeholders such as financial institutions and public administrations. These stakeholders defend the continuity of these teams not only because they are 'too big to fail' (Plumley et al., 2017) but also because they are 'too important to fail'.

The findings emphasize a susceptibility to adverse shocks, coupled with a reluctance to adapt wage expenditures, as noted in prior studies (Szymanski, 2012, 2017; Szymanski and Weimar, 2019). The solutions proposed by Barajas and Rodríguez (2014) retain relevance, emphasizing the imperative of stringent financial control to avert insolvency for most teams.

Notably, lower-division clubs exhibit comparatively healthier financial situations based on the zeta scores than their top-tier counterparts. This aligns with the observations of García del Barrio and Szymanski (2009) regarding excessive expenditures by major clubs in their pursuit of competitive success, often at the expense of profitability (Sánchez et al., 2020). This suggests that achieving top scores in championships does not necessarily equate to efficient team management, as highlighted by Miragaia et al. (2019).

However, our research encounters two primary limitations. First, the results are specific to the limited number of teams participating in both divisions, potentially limiting generalizability to other teams or leagues. Second, the considerable disparity between the

dominant leaders, notably Real Madrid and Barcelona, and the rest of the teams raises questions about result homogeneity.

The primary focus of this research is on the collective group of clubs that comprise first and second divisions of Spanish competition, rather than on individual clubs. While this approach is valid and offers valuable insights into the broader competitive context, it inherently limits the applicability of the findings to individual clubs. Consequently, the results cannot be used to analyze the performance or solvency of any single club, but rather serve to provide an overview of trends. Despite this limitation, the analysis remains significant in offering a comprehensive understanding of league-wide developments

One potential area for future research is why larger and more powerful entities tend to show worse solvency ratios during crises, such as the one examined, compared to smaller entities that adapt better to exceptional situations. A qualitative analysis and the quantitative effect of specific decisions made by management teams could provide valuable insights for this field of research.

Conclusions

Despite the implementation of Financial Fair Play (FFP) regulations and domestic controls by La Liga in Spain, the trajectory of Spanish football teams from 2018/2019 to 2021/2022 has been

regrettably negative. In response to the first research question, the onslaught of the COVID crisis exacerbated financial vulnerabilities as revenues dwindled, while expenses, particularly player costs, remained persistently high. The repercussions of the pandemic have been felt across various industries, including football. Notably, the post-pandemic year did not witness a resurgence in football performance despite the relaxation of movement restrictions. This distinct characteristic sets the Spanish football industry apart, attributable to the protective measures implemented by authorities and external entities, including financial institutions.

The financial landscape of football clubs underwent significant transformations over the study period. In 2018/2019, profitability and coverage of current liabilities predominantly dictated the diverse situations of the entities. The subsequent year, 2019/2020, witnessed indebtedness and capitalization taking precedence. The exceptional circumstances of 2020/2021, influenced by the pandemic-induced loss of critical revenue sources (e.g., tickets and TV rights), made indebtedness and short-term solvency the defining factors. Finally, in

2021/2022, profitability and short-term solvency emerged as the primary explanatory characteristics. Overall, financial distress in teams can be attributed to two main factors: profitability and short-term solvency.

Regarding the second research question, a stark disparity between the first and second division is noteworthy, especially when considering global powerhouses Barcelona and Real Madrid. Despite variations in size and financing, the second division demonstrates superior solvency indicators, particularly in the year following the pandemic outbreak.

Significantly, both divisions heavily rely on external resources for short-term financing. The substantial weight of noncurrent assets, attributed to infrastructure and transfer rights of players and coaches, underlines the industry's strong dependence on external funding. Specifically, larger teams exhibit relatively higher indebtedness compared to smaller counterparts, possibly influenced by the unprecedented transfer market.

In the post-pandemic period, first-division teams faced high levels of debt and precarious liquidity conditions. Second-division teams, on the other hand, focused on profitability, which had already been a concern before the pandemic.

Contrary to expectations, there is no discernible improvement in the financial trajectory of larger clubs compared to smaller ones in most cases. This suggests that available resources alone do not determine effective management. Given the broader range of financial resources available to larger clubs, the inability to adapt more effectively to unique circumstances is surprising.

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