ISSN: 1756-8811

Birkbeck Sport Business Centre

Research Paper Series

THE 'S-SCORE' OF FINANCIAL SUSTAINABILITY FOR PROFESSIONAL FOOTBALL CLUBS

Richard Evans

Birkbeck, University of London

Volume 15, Number 1, July 2023

The 'S-score' of financial sustainability for professional football clubs

Abstract

This paper extends the extensive literature on business failure and, in particular, develops the approach of Altman (1968, 2000) to provide quantified recommendations for the financial sustainability of football clubs.

The paper uses multiple discriminant analysis and uniquely identifies financial models that delineate between professional football clubs that experience insolvency events and those that do not. These produce a financial sustainability score ('S-score') and are introduced for football clubs in the English Football League (EFL) in four scenarios that have caused insolvency. The models suggest minimum financial tolerances for accounting ratios to provide a reasonable level of resilience for the financial sustainability of clubs in each scenario.

The results are relevant for academics and non-academics with an interest in the business of football, professional football clubs aiming to avoid financial distress and specifically, the Regulator that the UK government has proposed for football in England.

Key words: Business failure, football club finance, financial regulation, multiple discriminant analysis

The 'S-score' of financial sustainability for professional football clubs

1. Introduction

There is a history of financial distress for professional football clubs in England. As long ago as the mid-1960s concern about the financial position of football clubs in England led to both the P.E.P report[1] and the government committee of inquiry into the state of association football which produced The Chester Report[2]. The football authorities have attempted to address this problem with a variety of financial regulations. Some have aimed to maintain the profitability of the clubs and others have aimed to control the wage spending of clubs. However, clubs continue to fail financially[3]. In these cases the financial distress usually gets socialised onto multiple stakeholders and can have significant economic and social consequences for local communities.

The government has attempted to address this problem but has hitherto been reluctant to directly intervene with legislation. However, in 2021 the government commissioned a "Fan-led review"[4] which led to the publication of a White Paper (2023) on the reform of club

[1] Political and Economic Planning (1966). English professional football. Planning. Vol. 32, No. 496.

[2] Department of Education and Science (1968). Report of the Committee on football, Chairman: D.N. Chester. London: H.M.S.O.

[3] For example, Derby County entered into administration on 22 September 2021. Retrieved from https://find-and-update.company-information.service.gov.uk/company/09740438/insolvency [Accessed: 11 June 2023]

[4] Fan-led review of football governance (November 2021). Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1135464/Football_Fan_led_Governance_Review_v8Web_Accessible.pdf. [Accessed: 21 May 2023]

football governance. This proposed to introduce a Regulator for football with statutory power to reform the industry and provide greater protection against the financial failure of football clubs. The White Paper recognised the failure of previous attempts by the football authorities to adequately address the problem and instead recommended an approach which targeted the liquidity of football clubs. However, the White Paper does not develop its recommended approach but instead leaves that to the Regulator.

This paper provides guidance for that Regulator, for professional football clubs aiming to avoid financial distress and both academics and non-academics with an interest in the financial sustainability of football clubs, on the measures that should form the basis for the regulation. Section 2 provides a brief literature review of the extensive literature on the financial failure of businesses and the less extensive literature on the financial failure in the football industry. The methodology for this paper, presented in section 3, is a development of that introduced by Altman (1968, 2000) and uses multiple discriminant analysis to identify financial models that delineate between clubs that experience insolvency events and those that do not. These produce an indication of the risk of an insolvency event ('S-score') for each season of football clubs in the English Football League (EFL).

Unlike previous research, this paper draws on the literature to recognise the differing circumstances in four scenarios that have caused insolvency for football clubs and goes further by identifying the differences in the financial tolerances required to provide a reasonable level of resilience for the financial sustainability of clubs in each scenario.

The results presented in section 4 show that a positive S-score is a good indicator of financial sustainability with only three of thirty five insolvency club seasons having a positive S-score. There is a discussion of the results in section 5 which also considers the limitations of this research. Section 6 provides the conclusion to the research with practical guidance as a

warning for football clubs, and for a Regulator of football, on the accounting ratios and their values consistent with the financial sustainability of professional football clubs in each of the four scenarios of insolvency events.

2. Literature review

There is an extensive literature (and practice) with a long history relating to the explanation and prediction of financial distress and insolvency for individual companies (Taffler and Tisshaw, 1977; Zopounidis and Dimitras, 1998). Balcaen and Ooghe (2006) provide an overview of the classic statistical methodologies and their related problems.

A widely used model in the literature to predict financial distress in firms was provided by Altman (1968). This incorporated ratio analysis in a multiple discriminant analysis model to produce a 'Z-score' for the business which is the basis for discriminating between predicted outcomes.

Altman (2000) provided three different discriminant functions for the cases of:

(a) industrial corporations

(b) as (a) but adapted for private firms

(c) as (b) but adapted for non-manufacturing firms

Model (c) would be the more appropriate for football clubs. This model, with parameter estimates provided by Altman, is:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where:

Z'' = overall index

X_1 = working capital / total assets

X_2 = retained earnings / total assets

X_3 = earnings before interest and taxes / total assets

X_4 = book value of equity / total book value of liabilities

However, all of these models make the strong implicit assumption that all bankruptcies have similar financial characteristics. This assumption is unlikely to hold as, for example, bankruptcies resulting from loss revenue from a key customer, loss of profitability from the emergence of a new competitor or shortage of cash due to poor cash management will each have different weight given to the model variables.

Arnold and Benveniste (1987) identified four factors which determined the size and strength of the football industry in England. They are:

1. Price increases that exceeded inflation
2. Product extension, such as European competitions and the introduction of floodlight facilities
3. Additional finance from external sources, such as sponsorship, television, advertising and lotteries
4. Income sharing arrangements that have financially supported clubs which would otherwise have been forced out of business.

The cause of insolvency of football clubs was the subject of research by Beech et al (2008 and 2010). They identified five situations ("archetypes") characteristically associated with the insolvency of football clubs in England which they intend to develop with an in-depth interview phase. The archetypes identified by Beech et al (2010) are:

1. Clubs that have failed to cope with relegation
2. Clubs that have failed to pay monies due to the government
3. Clubs that have seen 'soft' debt become 'hard' debt
4. Clubs that have lost the ownership of their stadium
5. The 'repeat offenders'

Never-the-less, several authors have adopted the (c) version of the model with variables and parameters estimated by Altman and applied the accounting data for football clubs (Plumley et al, 2020; Barajas and Rodriguez, 2014). Barajas and Rodriguez (2014) justify the adoption of these variables and coefficients on the grounds that "… we are not going to use it as a prediction tool but as a classification instrument … (ibid., p. 77). However, there are several reasons to suggest that whilst the approach has validity the blind adoption of the variables and parameter estimates does not.

A fundamental difference between all three of the models estimated by Altman and football clubs is that whilst it can be assumed that the businesses in the United States that provided the data for the Altman models were all pursuing a financial objective, namely to maximise their profits, there is abundant evidence that football clubs pursue a sporting objective (Sloane, 1971). Losses regularly occur with football clubs but most do not result in insolvency events because, unlike for profit maximising business, owners are often able to source finance to maintain sufficient liquidity to maintain the club. Consequently, the inclusion of retained earnings in the model is less relevant for football clubs. Furthermore, in the case of football clubs, the retained earnings for the period are similar, and usually identical to the earnings before interest and tax as both of the items and other differences tend to be relatively small for football clubs. Therefore, including both X_2 and X_3 in the model will cause multicollinearity in the model applied to football clubs.

Since the inaugural season of the Premier League in England there have been 59 instances of insolvency events with clubs competing in the top four divisions of professional football in England. Table 1 shows the number of insolvency events per season in each league from the 1992/93 season (which was the first season with a Premier League) to the 2021/22 season. The leagues are referred to as 'tiers' because they were renamed in the 2004/05 season.

Table 1. Instances of insolvency events by league, 1992/93 to 2021/22

	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07
Tier 1															
Tier 2							3	1	1	2	3	1			1
Tier 3		2			2				1	3	3		1	1	
Tier 4	1		2		2		2		2	3	2		1		1
Total	1	2	2	0	4	0	5	1	4	8	8	1	2	1	2

	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	Total
Tier 1			1													1
Tier 2		1	1		1							1	1		1	18
Tier 3	2	1		1		1										18
Tier 4	1	2			1	1						1				22
Total	3	4	2	1	2	2	0	0	0	0	0	2	1	0	1	59

However, in all cases the club survived, or re-emerged as a phoenix club (e.g. Aldershot FC which failed in 1992 and supporters quickly formed Aldershot Town AFC instead). Storm and Nielsen (2012) argued that the paradox of a high survival rate of football clubs, despite persistent deficits and growing debts, can be explained by the 'soft' budget constraints that football clubs operate within. "In short, decision makers and managers expecting bailouts or support in case of financial trouble ex post have strong incentives to increase expenditure above the initial budget, leaving the additional costs, that is firm deficits, for the principal to pay, thus resulting in a softening of their budget constraints." (ibid., p. 189).

Szymanski (2012) used data for 37 seasons from 1973/74 to 2009/10 to test the alternative hypothesis of exogenous "demand shock" or "exuberant spending" as the cause of insolvency of English football clubs and found support for the former. This research was extended by Scelles, Szymanski and Dermit-Ricard (2018) to examine insolvency in the top three divisions in France which also found that "… demand (attendance) shocks can account for insolvency to a significant degree." (ibid., p. 1). However, this is a false dichotomy as there is no reason to suppose that either cannot be a cause, or that there could be other relevant factors that were significant in particular cases.

A significant example of demand shock was the withdrawal of ITV Digital in 2002, mid contract, for the broadcasting rights for clubs in the EFL. Sixteen clubs experienced insolvency events within the next two years. Clubs that had spent in anticipation of future broadcasting revenue were unable to unwind their positions quickly enough to meet their financial commitments. The Covid pandemic was also a significant exogenous demand shock which affected both the 2019/20 and 2020/21 seasons with the rescheduling of games and clubs being forced to play without fans in attendance which caused a loss of matchday and related revenue. However, unlike in the ITV Digital situation, no clubs that were not in financial distress in 2019 (i.e. prior to the pandemic) experienced an insolvency event in either of the pandemic affected seasons or the following season.

The prevalence of exuberant spending, which can be considered as a form of gambling, by clubs in the Championship was researched by Evans et al (2022). They found that, in 256 of the 270 club seasons for clubs in the Championship in both the current and previous season from 2004/05 (when the tier 2 league was renamed as the Championship) to 2019/19, 45% gambled. Of the forty five promotion slots in the Championship in these fifteen seasons eleven were taken by teams that were in the Premier League in the previous season and two by teams that were in League One in the previous season. Of the other thirty two slots, twenty eight were taken by clubs that gambled and only four were taken by clubs that did not gamble. This illustrates the 'arms race' that drives behaviour in the Championship. It shows that gambling was almost essential to gain promotion but that with the number of clubs choosing this strategy greatly exceeding the available three slots for promotion (or three slots to avoid relegation) and consequently, for many clubs, the gamble did not pay off and they were only sustainable with external finance that covered their financial commitments.

The UK Government published a White Paper in 2023 to address the issue of the (non-) sustainability of football clubs. It identified the problem of clubs lacking resilience against financial shocks, such as a geopolitical shift, a failed promotion or a disinterested benefactor.

This paper develops the scenarios of financial distress addressed in the literature from the 58 insolvency events experienced by football clubs competing in the EFL[5]. It identifies related indicators to support a respecified and estimated version of an 'Altman like' accounting ratio based model for application to football clubs in England.

The method of analysis adopted is discriminant analysis. This is a multivariate statistical technique to identify differences among groups with respect to several variables simultaneously. It has been applied to a wide variety of research and predictive problems in fields as diverse as personality research[6], horticultural research[7] and business failure in the United States (Altman, 1968 and 2000). Hitherto, however, it has not been applied to research the differences between football clubs that experience insolvency events and those that do not. This paper addresses that gap in the literature.

[5] The Premier League (tier 1) is administered separately from the EFL, which administers the second, third and fourth tier leagues, and there was one case of a club experiencing an insolvency event whilst in the Premier league (Portsmouth in 2010).

[6] Sherry, A. and Henson, R.K. (2005) Conducting and Interpreting Canonical Correlation Analysis in Personality Research: A User-Friendly Primer, Journal of Personality Assessment, 84:1, 37-48.

[7] Cruz-Castillo, J.G., Ganeshanandam, S., MacKay, B.R., Lawes, G.S., Lawoko, C.R.O. and Woolley, D.J. (1994). Applications of Canonical Discriminant Analysis in Horticultural Research. HortScience, Vol. 29(10).

3. Method

Altman (1968) established the potential of accounting ratios to be used in combination to discriminate between solvent and insolvent businesses and that approach has been adopted for this paper.

A database was created with data from all the financial accounts of clubs that competed in the three divisions of EFL that were available from Companies House for the league seasons from 1992/93 to 2018/19. Accounts were available for the season encompassing the insolvency event for 33 of the 58 instances of insolvency for clubs in the EFL since the formation of the separate Premier League (in the 1992/93 season). In those instances where contemporary accounts were not available the accounts for the most recent of either of the two preceding seasons were included as potentially reflecting some degree of the oncoming financial distress.

All of these instances were reviewed with reference to the literature and the accounts, to identify a set of scenarios that characterised them. The four scenarios of insolvency events identified are:

1. Demand shock. An exogenous event adversely affecting football club finance
2. Exuberance. Spending on wages in false expectation of sporting success to finance it defined by a total wage increase greater than revenue increase in the current or previous two years
3. Finance shock. The loss of critical source of finance defined by the sum of short term loans and long term debt due to owners and related parties, net of cash, which exceed total assets

4. Sporting distress. The anticipated loss of revenue and/or reduction in wage spend pending expected relegation in the current or season or actual relegation in the previous season.

The first two scenarios correspond to the situations considered by Szymanski (2012) and by Scelles, Szymanski and Dermit-Ricard (2018). A degree of financial resilience is required by any commercial enterprise to avoid financial distress in adverse circumstances. Professional football clubs operate as businesses but, unlike in other industries, they compete on a measure of operating success, namely the sporting competition. This creates the potential for conflict between the commercial and sporting objectives of the clubs. The balance in favour of attaining the sporting objectives is strengthened by the, often passionate, demand of the clubs' customers, the fans. The kudos of satisfying this demand can influence the owners of the club to give more weight to the sporting success than to the financially sound commercial success of the club. The willingness and ability of owners to do this can result in a business that is unable to withstand an exogenous demand shock and excessive exuberance itself can cause a football club to become insolvent.

The third corresponds to situations such as a 'disinterested benefactor' as identified by Arnold and Benveniste (1987) and in the White Paper (2023). Clubs often operate with funding that was not generated from the operation of the business. Insolvency can then result if circumstances change and that funding, which is necessary to meet the requirements for the business, ceases to be available. It is not unusual for football clubs to depend on the continued funding from their owners and a time can come when they are unwilling or unable to continue to do so. Failure to find alternative funding or new owners to fund the business can cause a football club to become insolvent.

The fourth was identified by Beech et al (2010). Clubs that are relegated each season move to a lower league and that is generally associated with a reduced ability to generate income. Attendances are generally lower in lower leagues resulting in reduced matchday income. The main expense of a professional football club is normally the amount of wages paid to the players. They are employed on fixed term contracts which often do not have a break clause in the event of the club being relegated. Consequently, in the event of relegation, income is reduced but the wage bill is 'sticky' and this downward rigidity can translate sporting distress into financial distress and then owners may also be less willing to fund a relatively less attractive club.

The club seasons related to each of the insolvency scenarios are shown in the Appendix. In some cases the event could be classified in more than one scenario and in these cases they have been included in each of the possible scenarios. There were five (of the thirty three) events that could not be classified in any of the four scenarios and they have been omitted from the representation of insolvency events.

The club accounts representing the insolvency events for each scenario were compared to the set of accounts available for 216 club seasons which were unrelated to insolvency events from the most recent available EFL league seasons (2018/19 to 2020/21 inclusive). This included two seasons when the financial results of clubs were affected by the covid pandemic. To the extent that the pandemic weakened the financial strength of clubs in this period it will tend to reduce the comparative difference between these club seasons and the earlier insolvency club seasons. For 157 of these accounts sufficient detail was available to enable them to be reformatted to separately identify the sources and applications of finance reported in the profit and loss accounts and balance sheets of the clubs. The reference set of solvent club accounts was restricted to clubs in the EFL because Portsmouth were the only club to experience an insolvency event whilst in the Premier League.

The data set of solvent club seasons and the data sets for insolvent club seasons for each scenario were smoothed to remove outlying observations. For each set this was an iterative process so that the remaining observations were all within a 95% confidence interval about their mean.

The following accounting ratios were tested individually and in combination to recognise the solvency strength of the business:

Measures of profitability

- Operating profit / Revenue (OPRV)
- Operating profit / Total assets (OPTA)

Measures of liquidity

- Current assets / Current liabilities (CACL)
- Working capital / Total assets (WCTA)
- Total cash spend / Short term loans (TCSL)
- Cash generated by operations / Total cash spend (COTC)
- Cash generated by over-trading / Total cash spend (CTTC)

Measures of solvency

- Total assets / Total liabilities (TATL)
- Long term debt / Short term loans (LDSL)
- Current assets / Net debt [long term debt + short term loans – cash] (CAND)

Operational measures

- Wage spend in current season / Wage spend in previous season (WSWP)
- Wage spend in current season / Total assets (WSTA)
- Transfer spend / Net book value of squad at start of season (TSBV)

The ratios for each scenario were selected using a 'data driven' inductive approach with trial and error to discriminate between the reference set of accounts representing solvent club seasons and the accounts representing insolvency events corresponding to each scenario.

Initially the structure used by Altman (1968) with a combination of ratios for profitability, liquidity, solvency and activity was tested with combinations of the measures as per the approach of Altman, with no account taken for the specific scenarios recognised in the case of football clubs. However, all of the combinations tested provided very poor discriminatory power.

Multiple discriminant analysis with STATA[8] was used to identify the ratio, or combination of ratios, that provided the most discriminatory power and in each case the model showing the unstandardised canonical discriminant function is reported. For each scenario the discriminatory power is defined as the ratio, or combination of ratios, with the highest percentage of correctly predicted insolvency events (α) with a p-value, associated with the F statistic for the given function, of less than 0.01[9]. The percentage of solvent club seasons incorrectly classified as insolvent (β) is also of interest as it provides an indication of the number of clubs that, whilst not actually experiencing an insolvency season, could be considered to be at risk of doing so.

The results for each scenario are presented in matrix form shown in Table 2.

[8] Using the STATA command 'candisc' and followed by the command 'estat loadings' with the option of 'unstandardized'

[9] The null hypothesis is that the function's canonical correlation and all smaller canonical correlations are equal to zero

Table 2. Template for scenario results presentation

		Classified Insolvent	Total Seasons
Actual	Insolvent	α	
	Solvent	β	

The total number of seasons depends on the number of insolvency club seasons associated with each model and the availability of data for each ratio for each club season.

The insolvency event seasons were then allocated as appropriate and in each scenario models were tested to identify the model with the most discriminatory power. Initially the structure used by Altman (1968) was again retained but again it proved relatively ineffective and so ratios were eliminated to find one or more ratios that increased the discriminatory power for each scenario. The resultant models provide an estimate the resilience of each club to withstand the financial challenge in each of the scenarios.

The club season data was applied to the models to produce a sustainability 'S-score', a latent variable, for each club season in the scenario. The club seasons were ranked in order of their S-score and inspected for cut off values indicated by the unstandardised data to provide a guide for the minimum values of these measures that are required to achieve financial sustainability.

The raw data from the ratios was then inspected for each of the ratios in each of the models to provide indicative guidance for the values that were generally sufficient to avoid insolvency seasons.

4. Results

The results for each of the four insolvency scenarios are presented below.

Scenario 1. Demand shock

The best fit discriminatory model used only the ratio of current assets to current liabilities (CACL) and produced the classification result shown in Table 3.

Table 3. Scenario 1: Demand shock results

		Classified Insolvent	Total Seasons
Actual	Insolvent	5 (83%)	6
	Solvent	53 (40%)	133

p-value = 0.0343

This result indicate that the short term liquidity provided by current assets relative to current liabilities provide the best protection against unexpected demand shocks. All the measures of solvency and profitability were rejected as they reduced the power of the model.

The unstandardised canonical discriminant model for the demand shock scenario (S^1) is:

$$S^1 = 5.76\ CACL - 1.52$$

The superscript refers to the scenario.

S^1 had a range from 1.96 to -1.46. None of the club seasons with a positive value for S^1 had an insolvency event. The model misclassified the insolvent club season with an S-score of -0.25. The five correctly classified insolvent club seasons had a maximum S-score of -0.60 with raw data value for CACL of 0.16. This means that in the insolvent club seasons the current assets of the insolvent clubs were less than 16% of their current liabilities.

The model misclassified 40% (53 of 133) solvent clubs and, at a level of CACL less than 0.16, 35% (46 of 133) of the solvent seasons would be misclassified. This suggests that although insolvency was not experienced in those seasons a reasonably large number of clubs may also have been at risk of experiencing insolvency due to a demand shock.

Scenario 2. Exuberance

The best fit discriminatory model suggests that the availability of short term liquidity measured by the ratios of cash generated by operations relative to the total cash spend (COTC) and the operational measure of the wage spend in the current season relative to the previous season (WSWP) provide the best protection against insolvency from exuberance. None of the measures of profitability or of solvency improved the result.

The model produced the classification result shown in Table 4.

Table 4. Scenario 2: Exuberance results

		Classified Insolvent	Total Seasons
Actual	Insolvent	10 (77%)	13
	Solvent	26 (32%)	80

p-value = 0.0031

The unstandardised canonical discriminant model for the demand shock scenario (S^2) is:

$$S^2 = 0.6.7\ COTC - \ 3.36\ WSWP - 5.31$$

Note that the coefficient on WSWP is negative which indicates that the more solvent clubs are less 'exuberant' as expected in this scenario.

S^2 had a range from 2.29 to -2.15. Two of the thirteen club seasons with a positive value for S^2 had an insolvency event. In these cases S^2 had the values of 0.68 and 0.14. Otherwise the largest S-score for a club season with an insolvency event was -0.21. However, the

separation between the insolvent and solvent seasons, where $S^2 = -0.21$, misclassified 25 of the 80 solvent club seasons which would suggest that although insolvency was not experienced in those seasons those clubs may have been at greater risk of experiencing insolvency.

The separation between the raw data of COTC for solvent and insolvent clubs occurred around 0.80 which means that in the insolvent club seasons the insolvent clubs generated cash from operations for less than 80% of their total cash spend, with only the two insolvent club seasons with a positive value for S^2 exceeding this value. Wage spend increased on average by 8% more in the insolvency club seasons than in the solvent club seasons. Wage spend in all the insolvency club seasons increased by between 2% and 15%.

Overall, the insolvent club seasons are characterised by an approximate values of $COTC < 0.8$ and $WSWP > 0$ suggesting that clubs with this combination of values are not well protected from an insolvency event due to exuberance in the order of that previously experienced by clubs in the EFL.

The model misclassified 32% (26 of 80) of the solvent club seasons, suggesting that they were at risk, but the data shows that there were only four club seasons that generated less than 80% of their total cash spend from operations and increased their wage spend by more than 15% but did not experience an insolvency event in those seasons.

Scenario 3. Finance shock

A challenge for the analysis in this scenario is that such clubs can appear solvent until the moment that funding is not available and it is not possible to assess the likelihood of a club losing a critical source of funding from historic financial accounts. However, the data produced a strong discriminatory result.

The best fit discriminatory model suggests that the long term solvency provided by total assets relative to total liabilities (TATL) and short term liquidity provided by working capital relative to total assets (WCTA) provides the best protection against finance shocks such as the discontinuation of financial support from a significant source. The model produced the classification result shown in Table 5.

Table 5. Scenario 3: Finance shock results

		Classified Insolvent	Total Seasons
Actual	Insolvent	8 (89%)	9
	Solvent	0 (0%)	25

p-value = 0.0000

The model correctly identified almost 90% of the insolvency event seasons. It also suggests that in none of the twenty five comparative seasons when clubs did not experience an insolvency event they were at risk in this scenario.

The unstandardised canonical discriminant model club score for the finance shock scenario (S^3) is:

$$S^3 = 1.89\,TATL + 0.85\,WCTA\ - 0.62$$

S^3 had a range from 1.66 to -4.92. Only one of the nine club seasons with a positive value for S^3 had an insolvency event and that was the only instance misclassified as solvent by the model. That had an S-score of 0.37. All of the other eight instances had S-scores of -0.86 or less. There were no club seasons that did not experience an insolvency event with such a low S-score. The lowest S-score for a club season that did not experience an insolvency event was -0.47 so the cut-off between the solvent and all but one of the insolvent clubs occurred in the range of $-0.86 > S^3 > -0.47$ and the data suggests that there were no seasons where a club that was solvent with an S-score of -0.47 or more was at risk of insolvency.

The separation between the raw data of TATL for solvent and insolvent clubs occurred around 0.42 which means that in the insolvent club seasons the total assets of the insolvent clubs were less than 42% of their total liabilities, although one of the nine insolvent club seasons had a raw value greater than this and three of the twenty five solvent club seasons (12%) had a value less than this. In all of the insolvent club seasons current liabilities exceeded current assets and consequently WCTA was negative in these cases. The largest value for the WCTA for the insolvent clubs was -0.93 (with one exception). This suggests that there is some tolerance for current liabilities to exceed current assets when the club experiences a finance shock even if their total assets are less than 42% of their total liabilities.

Overall, the insolvent club seasons are characterised by an approximate value of $TATL < 0.4$ and $WCTA < -0.9$ and the data suggests that clubs that exceed these values are relatively well protected from an insolvency event due to finance shocks in the order of that previously experienced by clubs in the EFL.

Scenario 4. Sporting distress

The data suggests that the combination of liquidity ratios, of working capital to total assets (WCTA) and current assets to current liabilities (CACL) provided the best fit discriminatory model. They produced the classification result shown in Table 6.

Table 6. Scenario 4: Sporting distress results

		Classified Insolvent	Total Seasons
Actual	Insolvent	7 (100%)	7
	Solvent	0 (0%)	35

p-value = 0.0000

This result suggests that this combination provides a high level of predictive accuracy both for clubs that are insolvent and for clubs that are solvent. It also suggests that few, if any, clubs in decline that didn't experience an insolvency event were at risk of doing so.

The unstandardised canonical discriminant model club score for the sporting distress scenario (S^4) is:

$$S^4 = 6.87\,WCTA + 1.99\,CACL + 1.60$$

S^4 had a range from 2.17 to -6.52. All of the insolvent club seasons had a negative S-score for this scenario with S-scores of -0.81 or less and there were no club seasons that did not experience an insolvency event with such a low S-score. The lowest S-score for a club season that did not experience an insolvency event was -1.94 so the cut-off between the solvent and all but one of the insolvent clubs occurred in the range of $-0.81 > S^4 > -1.94$.

Typically, the insolvent club seasons were characterised by a value of $WCTA < 0.5$ and $CACL < 0.25$. This means that in the insolvent club seasons working capital was less than 50% of the total assets of the club and the current assets were less than 25% of their current liabilities. Although eight of the thirty five solvent clubs (23%) also had a value for CACL less than 0.25 none also had a value for WCTA less than 0.5. The data suggests that clubs that exceed these values are relatively well protected from an insolvency event due to sporting distress in the order of that previously experienced by clubs in the EFL.

5. Discussion

All four models provided a good fit to the data for their respective scenarios with p-values less than 0.05. A positive S-score and the levels for financial ratios provided by the analysis in this paper do not guarantee that clubs will not fail financially but they will significantly reduce the risk without being too restrictive on the operations of the club. The four scenarios included thirty five instances of insolvency however there was only one club season (of six)

in scenario one, two club seasons (of thirteen) in scenario 2 and one club season (of nine) in scenario 3 where a club experienced an insolvency event with a positive S-score.

A general rule of 'a positive S-score' allows some contingency as, excluding the four 'outlier' S-score positive club seasons, the best S-scores for the insolvent club seasons had values of -0.60, -0.21, -0.86 and -0.81 for the four respective scenarios. It appears wise to allow for some contingency as the models for the demand shock and exuberance scenarios misclassified between 30% and 40% of solvent clubs which suggests that they were at risk of an insolvency event even though they didn't experience one in that club season.

The results support the approach taken by the White Paper (2023) to focus on regulating minimum levels of liquidity rather than profitability to mitigate against the risk of insolvency. The current assets of a club relative to their current liabilities was found to be a key ratio in the event of either a demand shock or a finance shock. In the latter case the models suggest that additional resilience from total assets relative to total liabilities is required. This focus on liquidity also implicitly restricts exuberance without the adverse effect of ossifying the leagues which result from the approach of simple wage controls.

The need for financial resilience and the key issue of liquidity is recognised in other fields. For example, guidance provided by the Charity Commission for England and Wales[10] states that the trustees of charities should "… develop a reserves policy that:

- fully justifies and clearly explains keeping or not keeping reserves
- identifies and plans for the maintenance of essential services for beneficiaries

[10] The Charity Commission for England and Wales. (2016). Charity reserves: building resilience. Retrieved from https://www.gov.uk/government/publications/charities-and-reserves-cc19/charities-and-reserves [Accessed 11 June 2023]

- reflects the risks of unplanned closure associated with the charity's business model, spending commitments, potential liabilities and financial forecasts
- helps to address the risks of unplanned closure on their beneficiaries (in particular, vulnerable beneficiaries), staff and volunteers" (ibid, Section 2)

However, hitherto, neither the Union of European Football Associations (UEFA), the Premier League nor the EFL have introduced any regulation or even provided any guidance to directly address this need.

These models provide an indication of the financial ratios that football club should seek to maintain to avoid the insolvency scenarios based on the experiences of clubs in the EFL as represented in the financial accounts that they have published at Companies House. However, more work is required to test the robustness of the results. It would be interesting to perform a similar analysis for clubs in leagues in other countries.

This research has required an element of judgement on the part of the researcher. One difficulty for this research was in determining the accounts which best represent the state of distress for a club. Many clubs experiencing financial distress fail to file accounts for the period including the insolvency event and sometimes also for preceding periods. In these cases the last available accounts may precede the financial distress and therefore not represent the club in financial distress. To address this problem the current or most recent accounts related to the event were examined. Where they showed no particular difference to preceding accounts it was assumed that they did not represent the club in distress. However, if they showed a worse financial position than in preceding accounts they were included in the sample to represent the club in financial distress. Some judgement was also required from the analyst to assess cut-off points for the separation of the raw data values between the solvent and insolvent club seasons in each scenario.

Another difficulty is (ironically) the few number of insolvency events. This is exacerbated when, if accounts are available, data required for some of the measures is not reported, further reducing the number of insolvency events in the analysis if the affected measures are included in the models. Consequently it has been important to recognise the number of events included in the models. Note also that the models only reflect the magnitude of historic events.

Furthermore, the method of analysis depends on assumptions and, in particular, the requirements for a multivariate normal distribution on the discriminating variables and equal variances for the solvent and insolvent groups. Violation of the first of these results in a sub-optimal classification of the club seasons whilst in the second it may not provide maximum separation between the groups of solvent and insolvent club seasons. Consequently it is claimed that the models presented are indicative but not necessarily optimal.

6. Conclusion

The financial sustainability of football clubs is important for the sporting competitions they participate in and for the wider economic and social consequences in the event of their financial failure. Whilst there has been extensive research into the failure of businesses in general the issue for football clubs has hitherto been under researched. This shortcoming is particularly critical as the UK government plans to introduce a Regulator with the responsibility of ensuring the financial sustainability of football clubs in England.

This paper has used multiple discriminant analysis with data from the accounts of clubs in the EFL to show that consideration of the financial ratios for football clubs that discriminate between solvent and insolvent club seasons is more nuanced and practically oriented than has appeared in the literature to date. Importantly, the analysis has shown the context specific indicators of financial distress. Four scenarios of financial distress that applied to football

clubs provided distinct discriminatory models with financial ratios and an S-score for each club season. Furthermore, it suggests practical limits for financial ratios to protect clubs in each of those circumstances. Whilst individual ratios may not suggest a financial problem for a club, this paper has shown that certain combinations of them applying in particular scenarios can do.

For practical purposes, for clubs to have the financial resilience to withstand any of the four scenarios that have resulted in insolvency, it is recommended that clubs maintain a positive S-score for all of the scenario models.

As a guide, individual ratios and values that should satisfy this requirement for financial sustainability are in the order of:

- Current assets / Current liabilities (CACL) > 0.25 with Working capital / Total assets (WCTA) > 0.5
- Cash generated by operations / Total cash spend (COTC) > 0.8 with Wage spend in current season / Wage spend in previous season (WSWP) < 0
- Total assets / Total liabilities (TATL) > 0.4 with Working capital / Total assets (WCTA) > -0.9

Liquidity measures are key in all of the scenarios and the models highlight the need in particular to be able to generate cash by maintaining a high level of current assets relative to current liabilities and restricting spend relative to the cash generated from operations. Note that the level of CACL required for scenario one is covered by scenario two. None of the scenario models suggested that either of the profitability measures were a significant discriminatory factor.

The results of the models for both the demand shock and exuberance scenarios also contain a warning of risk as a further 30% to 40% of the club seasons classified as insolvent did not

actually experience an insolvency event in those club seasons. The raw data also suggests that this is a concern but that the models may have overstated the extent of this latent problem.

It is intended that the findings from this paper should fill a void in the academic literature and operational practice of football clubs by providing practical guidance to professional football clubs to reduce their risk of experiencing an insolvency event and, in particular, to the governing bodies of professional football, including the Regulator for football which the government's White Paper (2023) has recommended be established with legal powers to protect the financial sustainability of professional football clubs in England.

Bibliography

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. The Journal of Finance. Vol. XXIII, September, pp. 589-609.

Altman, E. I. (2000). Predicting financial distress of companies: Revisiting the Z-score and Zeta® models. Retrieved from https://www.iiiglobal.org/sites/default/files/3predictingfinancialdistress.pdf [Accessed: 5 June 2016].

Arnold, A. J. and Benveniste, I. (1987). Wealth and poverty in the English Football League. Accounting and Business Research. Vol. 17, No. 67, pp. 195-203.

Balcaen, S. and Ooghe, H. (2006). 35 years of studies on business failure: an overview of the classic statistical methodologies and their related problems. British Accounting Review. Vol. 38, Issue 1, pp. 63-93.

Barajas, A. and Rodríguez, P. (2014). Spanish football in need of financial therapy: cut expenses and inject capital. International Journal of Sport Finance. Vol. 9, No. 1, pp. 73-90.

Beaver, W. H. (1966). Financial ratios as predictors of failure. Journal of Accounting Research. Vol. 4, No. 1, pp. 71-111.

Beech, J., Horsman, S. J. L. and Magraw, J. (2008). The circumstances in which English football clubs become insolvent. CIBS Working Paper Series, No. 4, Coventry: Coventry University.

Beech, J., Horsman, S. J. L. and Magraw, J. (2010). Insolvency events among English football clubs. International Journal of Sports Marketing and Sponsorship. Vol. 11, Issue 3, pp. 236-249.

Deakin, E. B. (1972). A discriminant analysis of predictors of business failure. Journal of Accounting Research. Vol. 10, No. 1, pp. 167–179.

Dermit-Richard, N., Scelles, N. and Morrow, S. (2019). French DNCG management control verses UEFA Financial Fair Play: a divergent conception of financial regulation objectives. Soccer & Society, Vol. 20, Issue 3, pp. 408-430.

Evans, R., Walters, G. and Hamil, S. (2022), "Gambling in professional sport: the enabling role of “regulatory legitimacy”", Corporate Governance, Vol. 22 No. 5, pp. 1078-1093.

Hamil, S. and Walters, G. (2010). Financial performance in English professional football: `An inconvenient truth’. Soccer & Society. Vol. 11, No. 4, pp. 354-372.

Insolvency Act 1986. Retrieved from http://www.legislation.gov.uk/ukpga/1986/45/contents [Accessed: 9 September 2015].

Klecka, W.R. (1980). Discriminant Analysis. California: SAGE Publications, Inc.

Plumley, D., Serbera, J-P. and Wilson, R. (2020). Too big to fail? Accounting for Predictions of Financial Distress in English Professional Football Clubs. Journal of Applied Accounting Research.

Scelles, N., Szymanski, S., & Dermit-Richard, N. (2018). Insolvency in French soccer: The case of payment failure. Journal of Sports Economics, 19 (5), 603-624.

Sloane, P. (1971). The economics of professional football: The football club as a utility maximiser. Scottish Journal of Political Economy. Vol. 17, June, pp. 121–46.

Storm,R. K. and Nielsen, K. (2012). Soft budget constraints in professional football. European Sport Management Quarterly. Vol. 12, No. 2, pp. 183-201.

Szymanski, S. (2012). Insolvency in English professional football: Irrational exuberance or negative shocks? North American Association of Sports Economists. Working Paper Series. Paper No. 12-02.

Taffler, R. J. and Tisshaw, H. (1977). Going, going, gone – four factors which predict. Accountancy. March, pp. 50-54.

White Paper, UK Government Secretary of State for Culture, Media and Sport. (2023). A sustainable future – reforming club football governance. HMSO, CP 799.

Zopounidis, C. and Dimitras, A. I. (1998). Multicriteria decision aid methods for the prediction of business failure. Springer.

Appendix. Insolvency related club seasons by scenario

1. Demand shock	2. Exuberance	3. Finance shock	4. In decline
Bury, 2002	Millwall, 1996	Hartlepool, 1994	Hartlepool, 1994
Carlisle, 2002	Oxford, 1998	Gillingham, 1995	Chester, 1997
Lincoln, 2002	Swindon, 1998	Chester, 1997	Millwall, 1997
Swansea, 2002	Swindon, 1999	Bournemouth, 1998	Oxford, 1999
Swindon, 2002	QPR, 1999	Swindon, 2000	Swindon, 2000
Darlington, 2002	Carlisle, 2000	QPR, 2001	QPR, 2001
Wrexham, 2003	Leicester, 2000	Darlington, 2002	Bury, 2002
	Swansea, 2000	Swindon, 2002	Lincoln, 2002
	York, 2000	Leeds, 2006	Swansea, 2002
	York, 2001	Darlington, 2007	Ipswich, 2003
	Lincoln, 2001	Coventry, 2013	Wrexham, 2003
	Darlington, 2002	Wigan, 2019	Cambridge, 2005
	Ipswich, 2002		Leeds, 2006
	Swindon, 2002		C. Palace, 2008
	Wrexham, 2003		Plymouth, 2009
	Darlington, 2007		Southampton, 2009
	Southampton, 2008		Coventry, 2013
	Plymouth, 2009		Bolton, 2017
	Port Vale, 2010		
	Coventry, 2011		
	Wigan, 2019		