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The relationship between the financial and sporting performance and the market value of Brazilian football clubs

Relação dos desempenhos financeiro e esportivo com o valor de mercado dos clubes de futebol brasileiros

Relación del rendimiento financiero y deportivo con el valor de mercado de los clubes de fútbol brasileños

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Abstract
This study aimed to identify the relationship between the financial and sporting performance of Brazilian football clubs and their market value. Data on the financial statements of the 30 most valuable football clubs in Brazil were collected from 2020 to 2022 through multiple linear regression, using the Ordinary Least Squares (OLS) method for data analysis. The results indicate that clubs with the greatest capacity to pay in the short term, those with the most debt, and those that invest the most in players, are the ones that maximize their market values the most. Additionally, good sporting performances, participation in Serie A, and a greater presence of foreign players positively influence the valuation of clubs. The study provides valuable information for investors and fans, who have become increasingly aware of football clubs, as these stakeholders require accurate data to visualize investment opportunities.
Keywords: Club value; Financial performance; Sporting performance; Football clubs

Resumo
O objetivo deste estudo foi identificar qual a relação dos desempenhos financeiro e esportivo com o valor de mercado dos clubes de futebol brasileiros. Foram coletados dados das demonstrações contábeis dos 30 clubes de futebol mais valiosos do Brasil, no período de 2020 a 2022, utilizando-se regressões lineares múltiplas, por meio do método dos Mínimos Quadrados Ordinários (MQO), para a análise dos dados. Os resultados indicam que os clubes com maiores capacidades de pagamento a curto prazo, os mais endividados e os que mais investem em atletas são os que mais maximizam os seus valores de mercado. Ademais, bons desempenhos esportivos, participar da Série A e maior presença de jogadores estrangeiros influenciam positivamente o *valuation* das equipes. O estudo contribui com informes aos investidores e torcedores, os quais têm ganhado evidência para os times de futebol, pois esses agentes necessitam de informações que viabilizem a visualização de oportunidades de investimentos.
Palavras-chave: Valor dos clubes; Desempenho financeiro; Desempenho esportivo; Clubes de futebol

Resumen
El objetivo de este estudio fue identificar la relación del rendimiento financiero y deportivo con el valor de mercado de los clubes de fútbol brasileños. Se recopilaron datos sobre los estados financieros de los 30 clubes de fútbol más valiosos de Brasil, de 2020 a 2022, mediante regresión lineal múltiple, utilizando el método de Mínimos Cuadrados Ordinarios (MCO), para el análisis de los datos. Los resultados indican que los clubes con mayor capacidad de pago a corto plazo, los más endeudados y los que más invierten en jugadores son los que maximizan sus valores de mercado. Además, los buenos resultados deportivos, la participación en la Serie A y una mayor presencia de jugadores extranjeros influyen positivamente en la valoración de los equipos. El estudio aporta información para inversores y aficionados, cada vez más sensibilizados con los equipos de fútbol, ya que estos agentes necesitan información para visualizar oportunidades de inversión.
Palabras clave: Valor de los clubes; Desempeño financiero; Desempeño deportivo; Clubes de fútbol

1 Introduction

Football, also known as soccer in some countries, is a passion among Brazilians and one of the most traditional and widely practiced sports in the country, attracting numerous consumers (fans), investors, athletes, and companies (Ferreira et al., 2018). Football clubs have become major leisure options for sports and large-scale events, generating billions in revenue over recent years (Dantas & Boente, 2012; Gonçalves et al., 2020). The 20 largest Brazilian clubs reached a historic high in 2023, with a total revenue of approximately BRL 9 billion, representing a 20% increase from 2022 (Sports Value, 2024).

With this financial growth, improving management models is essential, as clubs have shifted from operating solely based on values and traditions to focusing on objectives aligned with the business market, such as efficiency, profitability, and competitiveness (Rodrigues & Silva, 2009). For Gonçalves and Carvalho (2006), football has adopted typical commercial business characteristics, as sports entities began to commercialize football events and broadcast their matches on media such as television and pay-per-view, as well as leverage their brands to maximize financial and economic results. Zambom-Ferraresi et al. (2017) indicated that clubs are shifting toward a diversified model of revenue generation, relying not only on fans' investments but also on revenue from television rights and broader media to enhance financial performance.

Despite the economic and financial significance of football and the pursuit of new revenue streams, concerns remain about the financial management of sports entities (Miragaia et al., 2019; Marotz et al., 2020). Clubs continue to face financial problems that result in substantial debts and recurring economic losses (Chelmis et al., 2019), which weaken clubs' ability to invest in new athletes and structural assets and consequently, achieve greater media exposure, generate more revenue, and increase recognition. Additionally, the high levels of debt among Brazilian club result in low solvency, jeopardizing their investment capacity (Rezende & Dalmácio, 2015; Gomes et al., 2024), as well as their sustainability and ongoing participation in competitions. Inefficiency in management, particularly concerning financial resources and their impact on sports performance, often results in managers being unable to fully leverage the potential of the club's structure or brand, leading to an undervaluation of their actual market value (Silva & Las Casas, 2018).

Thus, sound financial and sporting management is crucial. Effective financial stewardship and strong sporting performance, such as exploring revenue opportunities, achieving operating profits, and attaining competitive results in domestic competitions, can positively influence a club's market value (Scelles et al., 2013, 2016). This is reflected in the variables used to determine a club's market value according to the methodology of Sports Value (2023), which considers market potential, sporting potential, and the use of revenue generated.

Regarding the evolution of resources and the impact of financial and sporting performance on club values, the following question arises: What is the relationship between financial and sporting performance and the market value of Brazilian football clubs?

The research is motivated by the growth of club-company models, which have gained prominence, especially following the approval and publication of Law no. 14.193/21, instituting the *Sociedades Anônimas de Futebol* (SAFs) [limited liability football corporations]. This change has prompted sports entities to seek new sources of funding, primarily through brand exploitation, which attracts consumer loyalty and external investors (Dantas, 2013; Gomes et al., 2024). Given this new context, our study is justified by the need to address the gap in studies on sports team valuation (Perechuda & Čarter, 2022), as the lack of research on the financial and sporting determinants of market value has focused mainly on European competitions (e.g., Scelles et al., 2016; Klobučník et al., 2019; Zelenkov & Solntsev, 2022), with even fewer studies on Brazilian football (e.g., Faria et al., 2019).

In this context, information generated by analyzing variables that positively or negatively impact club market value provides strategic tools for managers, especially investors and sponsors seeking to maximize club performance on and off the field (Gonçalves et al., 2020). The balance between financial and sporting factors can contribute positively to increasing market value, thereby enhancing returns on investment, and meeting the objectives of these stakeholders (Barros et al., 2011; Scelles et al., 2013, 2016; Ferreira et al., 2018). Thus, this information is vital for informed and strategic decision-making among stakeholders.

From a theoretical perspective, we aim to provide implications and evidence on a subject that has received limited exploration in football (e.g., Scelles et al., 2013, 2016; Faria et al., 2019; Zelenkov & Solntsev, 2022). In addition, this study sought not only to examine the importance of financial performance, as prioritized in previous studies, but also to investigate more comprehensively the roles of players and sporting performance in increasing the value of Brazilian football clubs. Developing or signing standout athletes and effectively utilizing their image through marketing, combined with positive media exposure resulting from strong sporting performance, can attract fans and external investors, leading to increased revenue and a higher club valuation.

This comprehensive theoretical analysis provides pertinent practical information on the factors that influence value creation, thus equipping managers with data to support decisions about where to focus efforts to enhance club value. Furthermore, as football undergoes a period in which investors and consumers are increasingly involved in clubs' operational dynamics, these stakeholders require information that demonstrates the effective management of resources. Sound management practices directly affect how external users perceive potential investment returns and their loyalty to the respective brands.

2 Theoretical Framework and Research Hypotheses

2.1 Financial and Sporting Performance

Clubs primarily focus on building competitive and high-performing teams to enhance the quality of football played on the field, thereby maintaining a level of competitiveness appropriate to the competitions in which they participate (Dantas et al., 2016). Consequently, clubs must acquire players to remain competitive, as football skills are in high demand in a highly competitive player market. According to Szymanski and Smith (1997), the number and quality of players acquired directly determine a team's position in the league. Since players are crucial to strong sporting performance, the authors noted that on-field success is positively associated with profits; clubs that perform better generate higher revenue, since performance directly influences income from ticket sales, television rights, sponsorships, and other sources.

Nevertheless, simply signing players is insufficient for achieving strong sporting results. It is also necessary to ensure that player wages are adequate and commensurate with the expected outcomes. Szymanski and Smith (1997) confirmed a positive relationship between wage expenditure and on-field performance, indicating that player compensation is linked to team success. Similarly, Gasparetto and Barajas (2018) highlighted the importance of signing talented players to secure competitive results, noting a strong association between player salaries and quality; theoretically, greater investment in players should yield superior sporting results.

Given that football is an industry driven by emotion, fans experience heightened satisfaction when watching renowned players and top clubs, which subsequently influences their engagement, purchasing of products, and attendance at matches (Shakina et al., 2020). The excitement generated by elite teams and athletes attracts both fans and sponsors or investors, leading to new revenue streams and a positive impact on football clubs' financial performance. Nonetheless, despite substantial investments, which are often financed through external sources, intended to enhance performance and secure victories, the inherent unpredictability of football can produce unforeseen outcomes and various financial challenges (Dimitropoulos, 2014; Marques & Costa, 2016).

Hence, the pursuit of better performance in matches, with the ultimate goal of winning titles, may lead to excessive debt and losses that undermine the clubs' net worth, particularly when poor on-field performance fails to generate anticipated economic and financial returns (Minatto & Borba, 2021). If a team's actual results do not meet projected goals, consumers (mainly fans) tend to pressure clubs to sign new players (Leitão & Baptista, 2019). From a financial perspective, player signings constitute one of the most significant expenditures for clubs, whether direct or indirect (Užík et al., 2022).

Football clubs continually strive for strong financial results, which are naturally higher when sporting success is achieved, such as winning championships or securing top positions. Income from broadcasting rights, ticket sales, branded merchandise, royalties, and other sources is maximized when teams perform well and receive positive media coverage (Haas, 2003).

However, Jahara et al. (2016) stated that clubs exhibit inefficient financial management, as inadequate resource management within clubs may place them at risk of insolvency, despite achieving good performance in competitions. Good financial performance does not always guarantee a club's success on the field (Jahara et al., 2016; Marotz et al., 2020). In fact, sports entities in precarious financial situations can sometimes achieve favorable sporting results (Pereira et al., 2015). Conversely, clubs with sound fiscal management may also fail to attain the expected results, thus disappointing their fans and investors. These circumstances exemplify the unpredictability and inconsistency characteristic of Brazilian football (Pereira et al., 2015). This unstable behavior is attributable to the dependence of Brazilian clubs on achieving good sporting performance during the season to secure strong financial outcomes, as the primary goal of every club is to win titles. However, there is often inadequate control over the resources invested to attain this objective (Dantas et al., 2015). The authors also attribute this financial inefficiency to the pressures exerted by internal agents (managers and board members) and external agents (fans, media, and investors/sponsors).

In this volatile and uncertain environment, Ferreira et al. (2018) noted that, although most Brazilian

clubs are not entities that aim to generate surpluses or profits, it is understood that positive financial (and economic) results are a means to achieve the ultimate goal, namely, efficiency in sports performance. This alignment between financial and sporting aspects is achievable through the pursuit of excellence in sporting performance, particularly in domestic and international competitions, which fosters enthusiasm in the sports environment, attracts new supporters, strengthens existing fan loyalty, and maximizes the surpluses or profits accumulated by the sports organization (Rossi et al., 2013; Abbas, 2023).

Additionally, it is necessary to align the allocation of resources with the performance of the sports entity (Silva & Mello, 2021), both in financial and sporting spheres, as knowledge of investment efficiency contributes to maximizing the club's market value. For Barros et al. (2011), clubs must pursue not only financial stability but also strong on-field performance, as successful match outcomes depend on acquiring quality players and effective financial and sports management teams to optimize revenues from ticket sales, sponsorships, television rights, and other sources.

Reinforcing this perspective, Ferreira et al. (2018) posited that if a club's sole focus is on sporting performance, it may overspend, thereby failing to add value to the club, as this can jeopardize the club's financial health through increased debt and likely deficits or losses. Conversely, according to these authors, when a club concentrates exclusively on improving financial results, it may curtail costs to the extent of neglecting the assembly of competitive and capable teams, thus compromising its potential success in competitions, and negatively affecting wealth generation (e.g., by failing to enhance the club's value).

Therefore, considering the growth in brand capitalization by clubs, primarily through marketing initiatives, it is essential to recognize that financial and sporting performance are distinct; nevertheless, each complements the other. Failure to balance these performances can undermine long-term wealth generation and market value maximization for clubs (Dantas & Boente, 2012; Ferreira et al., 2018; Chelmis et al., 2019). Within this context, the financial and sporting variables used in this research, along with the hypotheses, are presented.

2.2 Development of the Hypotheses

One way to demonstrate the appreciation or devaluation of a company's market value is through the Tobin's Q indicator, which reflects the company's capacity to be valued by aggregating market capitalization from its ability to generate positive results (Assaf, 2018). Tobin's Q is conventionally calculated by adding the market value of equity (MVE) and market value of debt (MVD), then dividing that sum by the replacement value of assets (RVA) (Assaf, 2018). When Tobin's Q yields a value greater than 1, it indicates that value has been added to the company relative to what has been invested; a coefficient less than 1 signifies a decrease in market value, reflecting the company's inability to return the invested capital (Butt et al., 2023).

However, in its classic application, Tobin's Q includes certain variables specific to companies listed on stock exchanges, where market value is derived from the MVS and MVE (Assaf, 2018; Faria et al., 2019). Such variables do not apply to Brazilian football clubs, as these entities do not have shares traded on the stock market (Faria et al., 2019). Additionally, the denominator, the RVA, is not always straightforward to estimate, since there are no active markets for some types of assets (Shepherd, 1986; Butt et al., 2023).

Considering the realities of Brazilian football clubs, namely their lack of publicly traded shares and the infeasibility of estimating the replacement value of assets, we adapted the formulation of Tobin's Q: MVE and MVD are replaced by the clubs' market values, as published by Sports Value, and the clubs' total assets replaced the RVA. Under this approach, the use of this indicator is both viable and advantageous compared to absolute market values, as Coscarelli et al. (2011) suggested that estimates made on a relative basis remove the impact of brand size, allowing for the comparison of organizations of varying scales. Thus, Tobin's Q was calculated as the ratio between market value and total assets (Chung & Pruitt, 1994; Búa et al., 2015; Faria et al., 2019).

In the financial domain, the first explanatory variable selected is the current ratio (CR). This metric is significant, as it indicates the amount of working capital available to meet short-term obligations, expressed as the ratio of current assets to current liabilities (Jahara et al., 2016). High levels of investment by clubs, coupled with poor management of maturities, can result in unfavorable short-term financial conditions (Dantas et al., 2015), underscoring the need for effective management of current accounts to maintain a healthy ratio and facilitate further investment. Consequently, in line with Faria et al. (2019), CR will be used as an explanatory variable, with its relationship to Tobin's Q expected to be positive. That is, higher current liquidity ratios are anticipated to correspond to higher market values for the clubs.

H1: The level of current ratio positively affects the market value of clubs.

Additionally, to evaluate whether there is a relationship between the level of debt and Tobin's Q, the debt ratio (DR) will be utilized, calculated as the ratio of total liabilities to total assets, which is an important metric for assessing the financial difficulties of clubs (Dantas et al., 2015; Ruta et al., 2022). This indicator is used to verify whether value creation is associated with debt in sports entities by analyzing whether external capital (debt) or equity capital has a greater role in financing investments and, consequently, in increasing market value.

Thus, if the estimated value of DR is positive, it indicates that the sports organization relies on third-party resources to meet investment needs for athletes and the operational sports structure. Conversely, if the

coefficient is negative, the sports entity can satisfy its needs using its resources, suggesting that the club depends minimally on external financing. This situation enhances the financial position and reduces financial expenses, leading to increased surpluses or profits earned (Faria et al., 2019). Accordingly, a positive relationship is expected between clubs' debts and their market value.

H2: The level of debt positively affects the market value of clubs.

To verify the influence of spending efficiency on the market value of clubs, the cost-to-revenue (C/R) ratio is utilized. This index is calculated as the ratio of operating costs or expenses to net revenue (Dantas & Boente, 2012). According to these authors, when the coefficient exceeds 1 (or 100%), expenses surpass revenues, creating a high probability that the club will incur a deficit or loss, which indicates inefficiency in resource utilization. Therefore, the C/R ratio is expected to have a negative estimated coefficient, as clubs should strive to minimize this indicator to achieve financial efficiency with the resources available, thereby increasing their market value through the maximization of surpluses or profits at the end of each fiscal year (Faria et al., 2019).

H3: The level of cost-to-revenue negatively affects the market value of clubs.

Additionally, as a second variable to assess the influence of spending efficiency on the market value of clubs, the return on assets (ROA) indicator is employed. This index is defined as the ratio of net profit to total assets (Pacheco, 2023). The indicator assesses the clubs' efficiency in utilizing investments to generate revenue and, consequently, maximize surpluses or profits (Pereira et al., 2015). According to these authors, the index should yield a positive value, demonstrating the club's ability to effectively use its assets to generate surpluses or profits, making this indicator a reliable proxy for financial performance. Consequently, this positive profitability result will have a favorable impact on the club's valuation.

H4: Profitability positively affects the market value of clubs.

As a final potential financial explanatory factor, the relationship between intangible investments and total assets is considered. Regarding this type of investment, Dantas (2013) and Pacheco (2023) stated that, for football clubs, intangible investments consist of expenditures on youth teams, specifically the costs associated with developing youth players within the club and acquiring economic rights from professional players. This variable is a suitable proxy, given that investments in athletes promote improved sporting results (Kulikova & Goshunova, 2014). Such outcomes maximize clubs' financial results through monetary awards and increased revenues from strong performance, while also enhancing media exposure and, consequently, maximizing the club's market value. Thus, a positive relationship is expected between intangible assets (Intang) and the maximization of clubs' value.

H5: Investments in athletes positively affect the market value of clubs.

Regarding sports proxies, the first variable considered is the score in the Brazilian Football Confederation (CBF) ranking. It is operationalized as the sum of points earned by clubs in domestic competitions, reflecting their performance in Campeonato Brasileiro [the Brazilian Championship] (Series A, B, C, or D) and Copa do Brasil [the Brazil Cup], according to the scoring system defined established by CBF (Faria et al., 2019).

According to Dantas (2013), this variable is important as it offers more realistic and equitable scoring criteria than the raw point totals. For instance, Copa do Brasil assigns distinct point values to each stage, and each division and position within these competitions carries different scores. Faria et al. (2019) noted that clubs spend most of the season in these respective competitions, making the evaluation of their performance essential. Therefore, the association between the CBF Ranking and market value is expected to be positive.

H6: Performing well in competitions positively affects the market value of clubs.

Regarding sports, the variables of first-division participation, promotion to Serie A, and relegation will be analyzed, as these factors represent clubs' success and failure, respectively (Dantas et al., 2015, 2016). The aim is to assess whether these variables are related to the value added to clubs, since Serie A clubs have more supporters (including fans and sponsors) and receive more revenue (Dantas et al., 2015, 2017), which in turn maximizes their media exposure and, consequently, their market value.

Furthermore, promotion behaves similarly to the first division variable, as it enhances the club's media exposure and sources of revenue, potentially positively impacting the club's value. Conversely, relegation decreases revenue and jeopardizes the ability to service existing debts (Dantas et al., 2017), which can negatively affect market value. Therefore, factors associated with first division participation and promotion to the top division are expected to have a positive relationship with value-added growth, whereas the relegation proxy is anticipated to exhibit a negative relationship with value-added growth.

H7: Participating in the first division (Serie A) positively affects the market value of clubs.

H8: Promotion to the first division (Serie A) negatively affects the market value of clubs.

H9: Relegation negatively affects the market value of clubs.

Lastly, the number of foreign players will be employed as an explanatory variable. According to Gerhards and Mutz (2017), clubs are becoming increasingly diverse due to the variety of nationalities represented among their athletes, and this diversity is associated with sporting performance. Hence, this factor was included to determine whether it influences value creation, as it has not yet been used as a proxy in previous research on Brazilian football. Up to a certain level of national diversity, a positive relationship is expected between this explanatory variable and sporting performance (Gerhards & Mutz, 2017), suggesting

that strong sporting performance can increase club valuation. However, once a certain threshold is reached, the number of different nationalities may negatively influence on-field performance (Gerhards & Mutz, 2017), potentially decreasing clubs' valuations. Therefore, the number of foreign players is expected to positively impact the market value of Brazilian clubs.

H10: The number of foreign players positively affects the market value of clubs.

3 Methodology

3.1 Data and sample

The data utilized in this study were obtained from the financial statements of Brazilian football clubs for the years 2020 to 2022, specifically the balance sheets, income statements (statements of profit or loss), and explanatory notes, which are available on the clubs' official websites and/or the websites of their respective federations. Additionally, information was extracted from Sports Value's technical studies on the valuation of Brazilian football clubs, as well as from the CBF website during the specified period. It should be noted that the data were adjusted according to the Broad National Consumer Price Index.

The research sample comprised the 30 most valuable clubs in Brazil, as listed in the annual studies conducted by Sports Value: América-MG, Athlético-PR, Atlético-MG, Atlético-GO, Avaí, Bahia, Botafogo, Ceará, Chapecoense, Corinthians, Coritiba, Cruzeiro, Cuiabá, Flamengo, Fluminense, Fortaleza, Goiás, Grêmio, Guarani, Internacional, Juventude, Palmeiras, Paysandu, Ponte Preta, Red Bull Bragantino, Santos, São Paulo, Sport, Vasco, and Vitória. To prevent bias and inconsistencies in the statistical analysis, clubs that did not disclose or provide incomplete financial statements, as well as those identified as outliers between 2020 and 2022, were excluded from the sample. As a result, Guarani was excluded for 2020 and 2022, while Náutico and Santa Cruz were removed for all years due to a lack of information.

This period was selected due to the availability of data on club valuation, since Sports Value only began publishing these figures in 2020. In 2018 and 2019, no consultancy firm studied or estimated the economic value of sports entities, resulting in a lack of data for these years. Prior to 2018, these evaluations were conducted by Binder Dijker Otte (BDO), although with a methodology that differed from that adopted by Sports Value. Consequently, it was not possible to extend the analysis period, as maintaining consistency in the data and results necessitated a standardized timeframe, thereby justifying the study's focus on the period from 2020 to 2022.

3.2 Variables

Based on the data collected, the financial and sporting proxies utilized in this study's analysis were identified and constructed, enabling the approximate measurement of the financial and sporting performance constructs (Table 1). The selection of these factors was grounded in previous studies. This research also advances the field by including certain variables that, to the authors' knowledge, have not yet been examined in Brazilian research, thereby contributing novel insights into the valuation of Brazilian football clubs.

Thus, regarding club valuation, adapted Tobin's Q was employed as the dependent variable, as this proxy is more appropriate for the context of Brazilian football clubs. Additionally, CR, DR, C/R, and Intang were used to assess financial performance. The proxies used to evaluate sports performance included the score in the CBF Ranking (Rank), dummy variables identifying clubs in the first division (Div), that were promoted (Prom) or relegated (Div), and the number of foreign players (FP). Club size (CS) was also included as a control variable to account for its effect on the estimation of the additional test performed.

3.3 Econometric models

Given the small sample size and the inability of panel data regression models to capture the temporal variability in the data, the econometric method of multiple linear regression was employed. The pooled ordinary least squares (POLS) method was employed, as econometric analysis seeks to explain the behavior of a dependent variable using one or more explanatory variables (Field et al., 2012). Accordingly, Equation 1 presents the general model, which includes the proposed explanatory factors for the market value of the clubs:

$$Tobin_{it} = \alpha + \beta_1 CR_{it} + \beta_2 DR_{it} + \beta_3 C/R_{it} + \beta_4 ROA_{it} + \beta_5 Intang_{it} + \beta_6 Rank_{it} + \beta_7 Div_{it} + \beta_8 Rel_{it} + \beta_9 Prom_{it} + \beta_{10} FP_{it} + \mu_{it} \quad (1)$$

In addition to the main model, supplementary regressions were conducted, with one model including only financial variables and another including only sports proxies as explanatory factors, while controlling for club size. These are represented in Equations 2 and 3, respectively:

$$Tobin_{it} = \alpha + \beta_1 CR_{it} + \beta_2 DR_{it} + \beta_3 C/R_{it} + \beta_4 ROA_{it} + \beta_5 Intang_{it} + \beta_6 Rank_{it} + \beta_7 CS_{it} + \mu_{it} \quad (2)$$

$$Tobin_{it} = \alpha + \beta_1 Rank_{it} + \beta_2 Div_{it} + \beta_3 Rel_{it} + \beta_4 Prom_{it} + \beta_5 FP_{it} + \beta_6 CS_{it} + \mu_{it} \quad (3)$$

Table 1
Summary of the variables used in this study

Construct	Proxy	Operationalization	Expected signal	Reference
Financial performance	Adapted Tobin's Q	Ratio of market value to total assets	Dependent variable	Chung & Pruitt (1994); Búa et al. (2015); Faria et al. (2019).
	Current ratio	Ratio of current assets to current liabilities	+	Faria et al. (2019); Pacheco (2023).
	Debt ratio	Ratio of total liabilities to total assets	+	Faria et al. (2019); Ruta et al. (2022).
	Cost-to-revenue ratio	Ratio of total operating costs/expenses to net revenue	-	Dantas & Boente (2012).
	Return on assets	Ratio between net profit and total assets	+	Dantas (2013); Pacheco (2023).
	Intangible investments	Ratio of intangible assets to total assets	+	Scelles et al. (2016); Pacheco (2023).
Sporting performance	CBF ranking	Natural logarithm of the sum of the clubs' scores in competitions organized by CBF.	+	Pereira et al. (2015); Dantas et al. (2016); Faria et al. (2019).
	First division (dummy)	1 for clubs in the first division and 0 for the rest	+	Dantas et al. (2015).
	Promotion	1 for clubs promoted to a division in the respective year and 0 for the rest.	+	Dantas et al. (2015).
	Relegation (dummy)	1 for clubs relegated from the division in the respective year and 0 for the rest.	-	Dantas et al. (2015); Dantas et al. (2016).
	Foreign players	Number of non-Brazilian (or naturalized) players in Brazil	+	Gerhards & Mutz (2017).
Control	Clube size	Natural logarithm of total assets	+/-	Pacheco (2023).

Each variable refers to company i at period t, where Tobin denotes the adapted Tobin's Q, α is the constant term, β_1–β_9 represent the coefficients of the explanatory variables, CR is the level of current ratio, DR is the debt ratio, C/R is the Cost-over-Revenue, ROA is the Return-on-Assets, Intang is intangible assets, Rank is the score in the CBF Ranking, Div is a dummy variable for first-division clubs, Prom is a dummy variable for clubs promoted to a higher division, Rel is a dummy variable for clubs relegated from a division, FP is the number of foreign players in the clubs, CS is the natural logarithm of the clubs' total assets, and μ is the regression error term.

Descriptive statistics and Pearson's correlation matrix were then generated for the variables to analyze their behavior and the level of association among the examined factors. Additionally, tests were conducted to verify the assumptions of normality, homoscedasticity, absence of residual autocorrelation, and the adequacy of the regression model (specifically, the Shapiro-Francia, Breusch-Pagan, Durbin-Watson, and regression specification error tests [RESET], respectively), to ensure the efficiency of the estimation. Table 2 presents the description and results related to the assumptions of normality, homoscedasticity, absence of residual autocorrelation, and model adequacy.

Table 2
Regression model assumptions

Assumptions	Test performed	Null hypothesis	*p*-value	Result
Normality of residuals	Shapiro-Francia	Residuals are normally distributed	0.6349	Failed to reject H_0
Homoscedasticity of residuals	Breusch-Pagan	The residuals are homoscedastic	0.0509	Failed to reject H_0
absence of Autocorrelation of residuals	Durbin-Watson	Residuals are not autocorrelated	0.1840	Failed to reject H_0
Suitability of the model	RESET	The model is adequate	0.1824	Failed to reject H_0

Note: * = Significance at the 0.05 (5%) level.

Initially, the Shapiro-Francia test was conducted to evaluate, under the null hypothesis, whether the residuals follow a normal distribution. The result yielded a *p*-value of 0.6349, indicating that the null hypothesis was not rejected ($p > \alpha = 0.05$) and confirming that the regression errors are normally distributed throughout

the estimation process. Homoscedasticity of the residuals was assessed using the Breusch-Pagan test, which, under its null hypothesis, assumes equal variance of the residuals across the distribution. The *p*-value obtained for this test was 0.0509, indicating that the null hypothesis cannot be rejected and supporting the finding of homoscedastic residuals, as values above 0.05 validate this outcome.

Subsequently, the Durbin-Watson test was applied to determine the presence of autocorrelation among the residuals. Under its null hypothesis, the test posits no autocorrelation. The errors were found to be uncorrelated, as evidenced by a p-value of 0.1840 ($p > \alpha = 0.05$), which failed to reject the null hypothesis. The RESET was performed to assess the adequacy of the multiple linear regression model and to detect any specification errors resulting from omitted variables. The test indicated that the model is well specified, as the null hypothesis was not rejected ($p > \alpha = 0.05$).

All descriptive analyses, including Pearson's correlation, multiple linear regression, and the associated assumption tests, were performed using RStudio software (v. 4.3.1) in R, utilizing the packages Hmisc, lmtest, car, psych, stargazer, and nortest.

4 Results

4.1 Descriptive and Correlation Analyses

Table 3 shows the descriptive analysis of the financial and sporting metrics addressed in this research. Tobin's Q demonstrates, on average, robust performance in relation to club valuations, although there is a considerable range between minimum and maximum values, as evidenced by a prominent standard deviation (SD). This indicates substantial dispersion among the clubs' values. The disparate variation in the market sizes of Brazilian clubs' highlights that most clubs are smaller than the sports associations with the greatest monetary resources, predominantly those in Serie A.

Table 3
Descriptive statistics of the metric variables

Variable	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
Tobin's Q	82	3.4205	2.4883	2.9016	0.8213	21.4108
CR	82	0.4468	0.3453	0.4471	0.0210	2.4826
DR	82	1.7279	1.0931	1.8228	0.1338	9.7364
C/R	82	1.2723	1.0661	0.8117	0.2011	6.8311
ROA	82	-0.0548	0.0055	0.3642	-1.6655	0.8514
Intang	82	0.1798	0.1415	0.1404	0.0002	0.7253
Rank	82	10.9124	11.3283	1.4195	5.6058	13.0815
FP	82	4.4268	4.0000	2.8503	0.0000	11.0000
CS	82	19.3711	19.3374	1.2270	15.8333	21.3842

The disparity in values can be attributed to the fact that some clubs are not in Serie A and thus do not benefit from large fan bases or significant revenues from ticket sales, sponsorships, and television rights, among other sources (Dantas et al., 2015). These factors hinder the maximization of financial performance and render the valuations of these clubs less representative of their true value. Additionally, sporting performance contributes to this contrast, as some Serie A clubs underperform; this phenomenon is generally limited to wealthier clubs with greater resources and higher market values.

Inefficiency in value creation was largely absent in the sample, as only two clubs exhibited coefficients below 1, indicating devaluation: Atlético-GO (0.9771) in 2020 and Guarani (0.8213) in 2021. These clubs were unable to create market value for the investments made in their assets, demonstrating inefficiency in utilizing investments to enhance value.

Regarding the CR, the indicator was not particularly significant, with a mean coverage of 44% of debt, reflecting the limited ability of the most valuable Brazilian clubs to cover short-term liabilities during the analyzed period. The proximity between mean and median suggests symmetry among the situations of several Brazilian clubs in the sample. However, the SD (0.4471) indicates considerable heterogeneity in the clubs influences short-term payment capacities, which is corroborated by the range between the minimum and maximum values. Jahara et al. (2016) corroborate these findings, reporting that Brazilian clubs are generally inefficient at meeting short-term debts, possibly due to the need for immediate resources, which, when unavailable, prompt reliance on expensive capital sources.

For DR, clubs exhibited overdrawn liabilities, indicating that their assets were insufficient to cover all obligations, as the mean exceeded 1 (1.7279). This may be attributed to inefficient management of available resources (Gomes et al., 2024), leading to accumulated losses as clubs fail to generate sufficient revenue to meet operating costs (Dantas et al., 2016).

Increased expenses impact the C/R ratio, and the rise in financial expenses may reduce the financial results of clubs. The proximity of the clubs' mean (1.2723) and median (1.0661) indicates that many clubs encounter difficulties in generating profits or surpluses during the fiscal years analyzed. Additionally, a significant SD (0.8117) was observed, indicating substantial variability in the C/R ratios, which reflects the economic and financial disparities among clubs. This can be explained by the fact that most clubs are non-profit associations and do not position themselves as entertainment and leisure enterprises; consequently,

they do not aim to generate profit or surplus (Marques & Costa, 2016).

The ROA indicator displayed concerning results, consistent with the difficulties indicated by the costs over revenues metric, with a mean of -0.0548 and a closely aligned median (0.0055), as well as a high SD (0.3642). This denotes considerable variability in the profits (surpluses) or losses (deficits) experienced by the clubs, indicating that the negative profitability performance within the Brazilian context is significantly influenced by the proportion of clubs incurring losses or deficits during the analyzed years. This pattern is reflective of the non-profit status of Brazilian clubs, which do not pursue positive economic results (profits or surpluses) (Ferreira et al., 2018).

Intangible investments, represented by economic rights to players and the costs of training athletes, remained low, indicating that most clubs do not invest heavily in players. For Gonçalves et al. (2020), Brazil maintains an export market pattern characterized by the necessity to sell athletes, driven by the recurring need for resources to support investments.

Regarding sporting performance, the most valuable clubs generally perform regularly, as most compete in Serie A and also tend to achieve consistent results in Copa do Brasil. Clubs typically have four foreign players, indicating a moderate reliance on players from abroad. Table 4 presents the correlation coefficients of the financial and sporting variables.

Table 4
Pearson's correlation of metric variables

Variables	Tobin's Q	CR	DR	C/R	ROA	Intang	Rank	FP	CS
Tobin's Q	1.0000								
CR	0.0843	1.0000							
DR	0.6207*	-0.3742*	1.0000						
C/R	0.2199	-0.2312	0.4439*	1.0000					
ROA	-0.2616*	0.3300*	-0.5242*	-0.1397	1.0000				
Intang	0.2609*	-0.0907	-0.1649	-0.1566	-0.0217	1.0000			
Rank	0.1653	0.3264*	-0.0872	-0.1168	0.1534	0.1449	1.0000		
FP	0.0510	-0.1343	0.0227	-0.0686	0.0462	0.1442	0.4049*	1.0000	
CS	-0.5032*	-0.0039	-0.4376*	-0.2316	0.2584*	0.1576	0.4150*	0.5744*	1.0000

Note: * = Significance at the 0.05 (5%) level.

The proxies for DR, ROA, Intang, and CS indicate potential correlations with the clubs' market value, as they were significant at the 5% level. Additionally, results suggest an absence of collinearity among the explanatory variables, since the correlations are either weak ($r < 0.30$) or moderate ($r < 0.70$).

4.2 Multiple Regression Analysis

Before analyzing the regression results, a variance inflation factor (VIF) test was conducted to assess multicollinearity among the explanatory variables. The mean VIF was 1.6792, with the highest value observed for the relegation variable (2.4531), which did not exceed the threshold of 10. These findings indicate that the factors are related but remain within acceptable limits. Table 5 presents the results of the multiple linear regression and VIF values for each variable. Some clubs were identified as outliers and excluded from the regression model, based on the boxplot and the rstandard function in R software. Consequently, 14 observations were excluded between 2020 and 2022.

Table 5
Estimation of multiple linear regression

Variable	OLS	VIF
Current ratio	1.3567*** (0.3174)	1.6174
Debt ratio	0.6362*** (0.0661)	2.1314
Cost-to-revenue	0.0291 (0.1067)	1.3304
Return-on-assets	0.3378 (0.2812)	1.5982
Intangible assets	4.8010*** (0.7675)	1.1456
CBF ranking	-0.0821 (0.0772)	1.9807
First division	0.8941*** (0.3235)	3.3065
Relegation	0.2385 (0.2685)	1.3762
Promotion	0.2093 (0.3328)	1.5570
Foreign players	-0.0434 (0.0359)	1.6473
Constant	0.6809 (0.7130)	
Observations	68	
R^2	0.7490	
F-statistic	17.0114***	

Notes: ***, ** and * = indicates significance at 1%, 5% and 10%, respectively. Standard errors are in parentheses.

At the 1% significance level, CR was found to be significant and positively associated with market value, which differs from the results of Faria et al. (2019), where this variable was not significant for the sample. This finding suggests that greater short-term payment capacity corresponds to a higher market value for

football clubs. In the financial domain, DR was significant at the 1% level and showed a positive relationship with the dependent variable (market value), indicating that higher levels of debt are associated with increased added value for clubs, which corroborates the findings of Faria et al. (2019). Intang exhibited a positive and significant relationship at the 1% level with club valuation, indicating that greater investments in athletes lead to higher club valuation, corroborating Scelles et al. (2016). Regarding the sports proxies, the only significant variable was the first division factor at the 1% level, which was positively associated with market value. This result demonstrates that clubs in the top division add greater market value, as also noted by Klobučník et al. (2019).

4.3 Additional Analysis

The estimation was controlled for club size, as this variable captures various factors that influence the financial and sporting dynamics of clubs over time, such as the suspension of sporting activities in 2020 and 2021 due to the COVID-19 pandemic. This event resulted in decreased revenues during the period and necessitated the renegotiation of substantial debts with creditors and tax obligations to the federal government, primarily impacting the clubs' financial management.

Including asset size as a control variable helps clarify how exogenous factors (beyond the control of the clubs) may affect clubs of different sizes, particularly the largest and smallest clubs in the sample. Table 6 presents the regression results by construct. Model I was estimated using only financial performance variables, while Model II included only sports performance proxies as explanatory variables; both estimations were controlled for club size. Due to the presence of heteroscedasticity and autocorrelation in the residuals, robust standard errors were estimated using the method of Andrews (1991) to address violations of these assumptions; both models exhibited a normal distribution of residuals.

Table 6
Regressions carried out for each construct (financial performance and sporting performance) controlled by club size

Variables	Robust OLS		VIF
	Model I	Model II	
Current ratio	1.4427*** (0.3309)		1.2949
Debt ratio	0.5353*** (0.0802)		2.0654
Cost-to-revenue	-0.0186 (0.1061)		1.2952
Return-on-asset	0.3312 (0.3411)		1.4707
Intangible assets	5.0383*** (0.7421)		1.0836
CBF ranking		0.2517*** (0.0854)	1.8134
First division		0.3749 (0.3650)	2.7121
Relegation		-0.1679 (0.3350)	1.3737
Promotion		0.0092 (0.4055)	1.5034
Foreign players		0.1663** (0.0696)	1.7830
Club size	-0.3182*** (0.0753)	-1.1333*** (0.1856)	1.6784
Constant	6.6908*** (1.5430)	21.1712*** (3.6292)	
Observations	68	68	
R^2	0.7434	0.5424	
F statistic	29.4511***	12.0505***	

Notes: ***, ** and * = indicates significance at 1%, 5% and 10%, respectively. Standard errors are in parentheses. Model I: estimation carried out only with financial variables as explanatory factors, controlled for club size. Model II: estimation carried out only with sports proxies as explanatory variables, controlled for club size.

According to Model I, CR, DR, and Intang were significant at the 1% level and positively associated with market value, confirming the results of the previous model. In Model II, the CBF rank was significant at the 5% level and had a positive effect on the market value of Brazilian clubs, demonstrating that better sporting performance in domestic competitions contributes to an increase in clubs' market value, thereby corroborating Scelles et al. (2013). Furthermore, at the 1% level, the variable representing foreign players showed a positive and statistically significant relationship with valuation, indicating that a greater presence of foreign players has a positive influence on market value. In both models, size was significant and exhibited a negative association with market value, suggesting that smaller clubs have higher market values.

4.4 Discussion of Results

H1 and H2 were supported, as the variables CR and DR were significant at the 1% level (99% confidence) and exhibited a positive association with market value, respectively. Thus, the more indebted the clubs are and the greater their short-term resources, the more they maximize their market value. This is explained by the frequent need for investments, given the consensus that clubs must invest considerable amounts in acquiring players to build a competitive club, participate effectively in competitions, and thereby increase their chances of success (Dantas & Boente, 2012; Dantas et al., 2016; Pacheco, 2023).

These investments are crucial, as greater spending on athletes increases the likelihood of winning titles and, consequently, earning higher revenues (Dantas & Boente, 2012; Marques & Costa, 2016). As investment increases and sports performance improves, maximizing financial outcomes, Faria et al. (2019)

stated that indebtedness for this purpose has a positive effect on the club's market value.

Although it may seem contradictory that the most valuable clubs are both those with the highest short-term payment capacity and the highest levels of debt, Minatto and Borba (2021) explain that the most insolvent clubs tend to allocate most of their debts to long-term (non-current liabilities) to present higher CR. Thus, it is understandable why clubs with the greatest market value also demonstrate the highest short-term liquidity, while simultaneously incurring the largest liabilities.

Despite high levels of debt being an explanatory factor for increased market value, clubs should enhance their management of financial challenges by employing regulatory or control tools, such as setting debt ceilings and spending limits, to ensure the sustainability of both the clubs and the entertainment industry (Terrien et al., 2017; Minatto & Borba, 2021). These practices align with the management measures of the professional models adopted by clubs today (e.g., SAFs), facilitating increasing investments and mitigating operational risks (Gomes et al., 2024).

Intang demonstrated a positive and significant relationship with club valuation at the 1% level, confirming H5. Consequently, greater investments in players correspond to higher club market values. In this context, as players represent clubs' main assets, the results emphasize the importance of investing in acquiring economic rights and the strategic training of athletes. The expenditures on these assets drive strong sports performance, which generates significant income for clubs, including player transfers, leveraging athlete image for marketing, ticket sales, and increased media exposure, thus positively affecting club valuation (Kulikova & Goshunova, 2014; Scelles et al., 2016; Užík et al., 2022).

In the additional test, at a 1% significance level and with 99% confidence, the score in the CBF rank was significant and had a positive effect on the market value of clubs. These results indicate that strong sporting performance enhances the value of clubs, corroborating Scelles et al. (2013), Faria et al. (2019), and Klobučník et al. (2019), and supporting H6. Hence, good performance in domestic competitions is a key explanatory factor for maximizing a club's market value. Superior performance attracts media attention to clubs, which positively influences increases in ticket revenues, sponsorships, and television quotas, all of which enhance clubs' financial performance and, consequently, raise their market values. Being domestic champions, qualifying for the top division, and, at times, competing in the first division are strong sporting achievements that positively influence the valuation of clubs.

Additionally, the first division dummy was also significant at the 1% level (99% confidence), with a positive estimated coefficient in relation to market value. Therefore, remaining in the first division has a positive impact on the market value of clubs, thereby confirming H7. In this scenario, one can infer that clubs in Serie A are structurally and financially larger than those in other divisions, primarily because, as participants in the top division, they have access to greater television quotas, attract more sponsors and fans, and benefit from additional revenue streams. This, in turn, contributes to improved financial performance and, consequently, to an increased market value of these clubs.

The advantages of competing in the first division are reinforced by Klobučník et al. (2019), who stated that the most valuable clubs are in large cities, where larger populations result in bigger stadium audiences and greater financial demand from the league. This leads to increased competitiveness and quality of competition, factors that positively affect the financial performance and market value of clubs. Therefore, it is evident that remaining competitive in the first division is highly advantageous.

As further demonstrated by the additional test, the foreign players' variable was significant (at the 5% level and 95% confidence) and showed a positive relationship with market value, supporting H10. Although its predictive value is lower than that of other explanatory sporting variables, there is evidence that cultural and national diversity increases the market value of Brazilian football clubs. According to Gerhards and Mutz (2017), this effect occurs because effective tactics and training methods are widely disseminated and adopted by clubs and coaches worldwide, enabling players to develop similar socialization and training, which facilitates the integration of new athletes from diverse nationalities. This expedites adaptation, allowing these players to fully demonstrate their abilities on the field, which benefits the clubs' performance and has important implications for their financial performance and valuation.

Moreover, when suitable options are lacking domestically, or simply by preference, clubs tend to sign foreign players who have excelled abroad, theoretically reinforcing their teams with skilled players who can positively influence fan and media attraction, leading to improved financial performance and market value.

The additional test indicated that the size variable was significant at the 1% level, with 99% confidence, and was negatively associated with market value. This finding suggests that smaller clubs were more effective in maximizing their market value. This relationship can be attributed to the events that occurred during the period analyzed, which was marked by the COVID-19 crisis. During this time, clubs faced several negative financial impacts, such as decreased revenue and the renegotiation of onerous and tax debts. The negative effects may have had a more pronounced impact on the market value of large clubs, due to greater media coverage of operational events involving these clubs. This suggests that increased media attention can decrease the valuation of large clubs, while less coverage of smaller clubs may enhance their market value, thereby explaining the observed relationship.

Consequently, the reduction in informational asymmetry regarding larger clubs may contribute to this result, whereas the mitigation of asymmetric information behavior does not occur as strongly among smaller

clubs. Additionally, the C/R and ROA were not significant; therefore, H3 and H4 were not confirmed. Furthermore, H8 and H9 were not supported, given the lack of significance observed for the promotion and relegation factors, respectively.

5 Final Considerations

This study aimed to identify the relationship between financial and sporting performance and the market value of the 30 most valuable Brazilian football clubs from 2020 to 2022. Secondary data were collected from the clubs' financial statements, technical reports published by Sports Value, and sporting information from the CBF website. Based on these data, multiple linear regressions were estimated using the ordinary least squares method.

Our findings indicated that to increase market value, clubs often incur debt, sometimes to the point of insolvency, to ensure adequate investment in their infrastructure, and especially in players. The professional performance of these athletes contributes to strong sporting results and winning championships, generating financial returns, and maximizing club market value. Accordingly, the current ratio and debt ratio were significant and positively influenced the value of clubs. Consistent with these findings, investments in players were shown to be important, as intangible assets —represented by the economic rights of professional players and the costs associated with developing youth players —had a positive impact on market value. Thus, players are essential for delivering strong on-field performances, and their image use has become increasingly relevant, attracting fans, investors, and additional television revenue, which, in turn, enhances the club's financial performance and value.

Regarding sporting variables, strong performance in domestic competitions such as Serie A and Copa do Brasil positively affected the clubs' market value. Better on-field results attract broader public interest, including both fans and investors, who ultimately contribute to the clubs' revenue streams and financial outcomes, enabling further investments and increasing overall club value.

Aligned with these findings, the variable representing first division status was significant and positively influenced club valuation. Clubs in Serie A can command higher market values due to greater access to resources from media, advertising, sponsorship, ticket sales, and consumer engagement. These benefits help generate essential funds, allowing for more strategic investments and sustained competitiveness in the competitions in which they participate. Such exposure places the club in the media spotlight, contributing to increased valuation. Additionally, the presence of foreign players demonstrated a positive and significant relationship with club market value, suggesting that signing players from other leagues can enhance a club's market profile. Through marketing and the on-field contributions of these players, clubs can benefit from increased revenue and greater market prominence, which in turn raises their market value.

This study's limitations include the relatively small dataset, resulting in a limited sample that prevented the implementation of a longitudinal statistical model to assess temporal variations among variables and individuals. Future research should consider expanding the sample and utilizing panel data econometric models to further enhance the understanding of this phenomenon. Given the increasing adoption of the SAF model, it is also recommended to examine whether the legal structure of the clubs, specifically, whether they are organized as limited liability football corporations or football sports associations, impacts their market value.

From a practical perspective, this research provides valuable information for managers, as well as fans and investors, who demand data reflecting the quality of club management, particularly as clubs become more open to new investments and transition toward a corporate structure. Furthermore, this study contributes new insights into the literature, emphasizing the importance of sporting performance and the role of athletes (i.e., the clubs' main assets) in club valuation. It also highlights the significance of attracting consumers and investors, factors that increase the prominence of clubs within the football market and drive improvements in financial performance and market value.

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