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IMPACT OF THE FOOTBALL MANAGEMENT MODERNIZATION AND FISCAL RESPONSIBILITY PROGRAM ON THE FINANCIAL AND SPORTING PERFORMANCE OF BRAZILIAN CLUBS

IMPACTO DO PROGRAMA DE MODERNIZAÇÃO DA GESTÃO DO FUTEBOL E RESPONSABILIDADE FISCAL NO DESEMPENHO FINANCEIRO E ESPORTIVO DOS CLUBES BRASILEIROS

IMPACTO DEL PROGRAMA DE MODERNIZACIÓN DE LA GESTIÓN DEL FÚTBOL Y RESPONSABILIDAD FISCAL EN EL DESEMPEÑO FINANCIERO Y DEPORTIVO DE LOS CLUBES BRASILEÑOS

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ABSTRACT

The professionalization of football in Brazil has heightened interest in the financial management of clubs, prompting the Brazilian government to establish the Financial Responsibility and Modern Management Program for Football (PROFUT). Hence, our research investigates the impact of adherence to PROFUT on the financial and sporting performance of football clubs in Brazil. We gathered accounting and sports performance data from 58 football clubs participating in the first, second, and third divisions of the Brazilian football championship. This data was sourced from the clubs' official websites and the Brazilian Football Confederation website. The collected data underwent unbalanced panel data regression analysis using the differences in differences estimator. As regards financial performance, the findings suggest that PROFUT participation increased clubs' total revenue and the specialization of their revenue structures. However, no impact was observed on indebtedness, undermining the program's intent to reduce clubs' liabilities. Furthermore, the results indicate that adherence to the program could potentially diminish a club's sporting performance, implying that managers seem unable to balance financial health with on-field results effectively. This study ventures beyond investigating clubs' revenue to examine underlying structural factors. Furthermore, it employs an innovative estimator in the context of financial and sports performance in Brazilian football clubs, particularly in relation to PROFUT regulations. Thus, this empirical research carries significant practical implications for directors and managers

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associated with football clubs and entities. It can guide regulatory bodies' strategic decisions, policy formulation, and inspection procedures.

Keywords: Corporate governance; Financial and sport performance; Football Clubs.

RESUMO

A profissionalização do futebol no Brasil aumentou o interesse na gestão da situação financeira dos clubes, o que levou o Governo a criar o Programa de Modernização da Gestão e de Responsabilidade Fiscal do Futebol Brasileiro (PROFUT). O objetivo deste estudo é identificar o impacto da adesão ao PROFUT no desempenho financeiro e esportivo dos clubes de futebol no Brasil. Coletamos dados contábeis e de desempenho esportivo de 58 clubes de futebol das séries A, B e C do campeonato brasileiro, nos sites dos clubes e da Confederação Brasileira de Futebol. Os dados foram submetidos à regressão de dados em painel não balanceado usando o estimador Diferença em Diferenças (DID). Em relação ao desempenho financeiro, os resultados sugerem que a adesão ao PROFUT aumentou a receita total dos clubes e a especialização da estrutura de receitas. Por outro lado, não parece ter impacto no endividamento, frustrando as expectativas do programa, referente a redução das dívidas dos clubes. A adesão ao programa reduziu o desempenho esportivo dos clubes, sugerindo que os dirigentes ainda não conseguiram equilibrar a saúde financeira dos clubes e os resultados dentro de campo. Como contribuições, nosso estudo investigou não apenas a captação de receita, mas também sua estrutura subjacente. Além disso, lançamos mão de um estimador inovador (DID) para o tema desempenho financeiro e esportivo em clubes de futebol brasileiros, tendo em vista a exploração da Lei PROFUT. Assim, as evidências empíricas deste estudo podem ser úteis para orientar decisões estratégicas de dirigentes e gerentes ligados a clubes e entidades de futebol, e a formulação de políticas e procedimentos de fiscalização, por parte dos órgãos reguladores.

Palavras-chave: Governança corporativa; Desempenho financeiro e esportivo; Clubes de futebol.

RESUMEN

La profesionalización del fútbol en Brasil aumentó los intereses en la gestión de la situación financiera de los clubes, lo que llevó al Gobierno a crear el Programa de Modernización de la Gestión y la Responsabilidad Fiscal del Fútbol (PROFUT). En este estudio examinamos el impacto de la adhesión a PROFUT en el desempeño financiero y deportivo de los clubes de fútbol en Brasil. Recopilamos datos contables y de rendimiento deportivo de 58 clubes de fútbol de las series A, B y C del campeonato brasileño de fútbol en los clubes y en el sitio web de la Confederación Brasileña de Fútbol. Los datos se sometieron a una regresión de datos de panel no balanceada utilizando el estimador de diferencias en diferencias (DID). En cuanto al desempeño financiero, los resultados sugieren que la incorporación a PROFUT aumentó los ingresos totales de los clubes y la especialización de la estructura de ingresos. Por otro lado, no parece tener impacto en el endeudamiento, frustrando las expectativas del programa en cuanto a la reducción de la deuda de los clubes. La adhesión al programa redujo el desempeño deportivo del club, lo que sugiere que los gerentes aún no han logrado equilibrar la salud financiera del club y los resultados en el campo. Como aportes, nuestro estudio investigó no solo la captación de ingresos de los clubes, sino también su estructura subyacente. Además, hacemos uso de un estimador innovador (DID) para el tema de desempeño financiero y deportivo en los clubes de fútbol brasileños, en vista de la exploración de la Ley PROFUT. Así, la evidencia empírica de este estudio puede ser útil para orientar las decisiones estratégicas de los directores y gerentes vinculados a los clubes y entidades de fútbol, y la formulación de políticas y procedimientos de inspección, por parte de los órganos reguladores.

Palabras-clave: Gobierno corporativo; Rendimiento financiero y deportivo; Clubes de fútbol.

1 INTRODUCTION

Football holds unique sociological significance, with cultural and social implications that extend beyond national boundaries (Giulianotti & Robertson, 2012). Over the past two decades, the commercialization of professional sports and the expansion of the football industry have significantly boosted club revenues and product earnings (Dimitropoulos & Scafarto, 2019; Malagila et al., 2020). The income of leading European clubs has risen by 9.8% annually (Holzmayer & Schmidt, 2020), with clubs like Real Madrid reporting a pinnacle of €750.9 million in 2019 the highest global football club revenue (Leite et al., 2020).

In Brazil, football is deeply ingrained in society and linked to the nation's cultural heritage essentially becoming part of its national identity (Félix & Silva, 2020). As the most popularly played sport, it draws a vast range of interested parties and generates billions in revenue. In 2019, the football segment contributed to 0.72% of Brazil's gross domestic product (Nazi & Amboni, 2020; Brazilian Football Confederation [CBF], 2019), in addition to total revenue (excluding player sales) from Brazilian clubs amounted to BRL 5.88 billion and BRL 4.55 billion, respectively (Itaú BBA, 2020).

With the professionalization of football, clubs have sought to balance on-field success with financial stability (Assis, 2017). Nonetheless, stakeholder satisfaction largely depends on those managing football affairs (Zulch et al., 2020). Insufficient skilled financial managers have contributed to Brazilian clubs' soaring indebtedness (Santana Filho et al., 2019). Complicating matters, football's structure facilitates private gain through favoritism, bribes, influence peddling, money laundering, and other forms of corruption (Assis, 2017; Pielke, 2013).

The Agency Theory posits that conflicts of interest exist among firm stakeholders, allowing agents to prioritize personal gain (Jensen & Meckling, 1976). To address this, the concept of corporate governance was introduced (Nazi & Amboni, 2020), which is a set of mechanisms designed to align stakeholder interests (Jensen & Meckling, 1976). The implementation of robust corporate governance practices could be key for clubs to meet market expectations, build strong reputations, and enhance fan relations (Freitas & Fontes Filho, 2011; Nazi & Amboni, 2020).

To incentivize clubs towards transparent, financially balanced management, the Brazilian government passed Law 13,155, as known as the Management Modernization Program and the Fiscal Responsibility of Football (PROFUT) (Santana Filho et al., 2019). PROFUT offers benefits such as deferred payments, reduced interest rates, and penalties on tax and fiscal debts (Ferreira et al., 2023). The program is projected to positively impact Brazilian football clubs' economic, financial, and athletic performance (Umbelino et al., 2019).

Nonetheless, existing research on PROFUT's effects on club financial management is not definitive (Ferreira et al., 2023). Some studies claim that PROFUT has improved clubs' financial performance (Marotz et al., 2020; Santana Filho et al., 2019; Silva et al., 2019; Siqueira Junior & Oliveira, 2018), while others have suggested that club indebtedness increased post-PROFUT (Ferreira et al., 2023), implying financial performance deterioration (Umbelino et al., 2019). Hence, this study sought to determine the impact of PROFUT on Brazilian football clubs, financial and athletic performance.

Corporate governance research in football is scarce and warrants further study of club management (Ferreira et al., 2023; Marotz et al., 2020). Our research contributes to the empirical discussion through a unique methodological approach. The conclusions drawn from our study could guide football club directors and managers in strategic decision-making and inform policy and inspection procedure formulation by regulatory bodies.

2 Governance in football and PROFUT: Conceptions and hypotheses

Football is among the most popular team sports worldwide, a trend attributable to easy accessibility in terms of necessary resources and equipment (Félix & Silva, 2020; Marotz et al.,

2020). Over the years, football has evolved beyond a purely recreational pastime (Costa, Costa, Angelo & Moraes 2018), influenced by fans' passion, to a significant business activity with substantial tax revenue (Rocha et al., 2021). The rise of football as a global business enterprise can be traced back to corporate branding strategies, advertising, and transnational media networks (Giulianotti & Robertson, 2012). These factors intensified competitiveness, revenue disputes, and sector commercialization, necessitating further professionalization among its participants (Assis, 2017).

The industrialization process in football had immediate financial impacts on clubs (Nazi & Amboni, 2020), making them attractive economic entities for global investors (Malagila et al., 2020). Increased revenues led to heightened investment levels among clubs seeking to capitalize on their projects, although this potentially resulted in financial difficulties (Dimitropoulos & Scafarto, 2019; Zulch et al., 2020). Football club debt levels seem to be increasing over time; in 2019, club debts rose by approximately 18% compared to 2018, amounting to R$ 8,093 billion (Itaú BBA, 2020).

This surge in the solvency process of sports entities might be affiliated with external forces like financial crises (Rocha et al., 2020), and internal factors including immature professionalization processes and administrative failures (Freitas & Fonte Filho, 2011; Nazi & Amboni, 2020). Moreover, football is frequently embroiled in scandals linked to opportunistic behavior of club directors, federation officials, players, and other sports agents (Assis, 2017; Pielke, 2013). Such scandals can erode the credibility of sports institutions and football (Nazi & Amboni, 2020).

Corruption allegations against football federation and club administrators in Brazil are often reported in the media. The CBF, the premier football authority in the country, witnessed the removal of its last three presidents due to evidence of irregularities and corruption (Mattos, 2018). In clubs, the most recent case is that of Cruzeiro Esporte Clube, one of the largest and most traditional teams in Brazil, whose directors were accused of crimes such as money laundering, embezzlement, ideological falsehood, and formation of a criminal organization (Piu, 2020). In 2023, police investigations disclosed betting manipulation schemes involving top-tier team players, signaling another blow to the sport's credibility among fans and competitiveness as an entertainment industry (Assis, 2017).

The architecture of football, abundant with resources, mounting political influence, and diverse audience interests, add to the risk of opportunistic behavior from agents (Zulch et al., 2020). In this context, the Agency Theory is a promising theoretical framework for understanding relationships between football clubs and their stakeholders (Rezende & Dalmácio, 2015). This theory posits the existence of agency conflicts, where agents' interests may not always coincide with their contractual objectives (Malagila et al., 2020). It is plausible, therefore, to expect individuals to behave selfishly when given the opportunity to pursue personal gains (Jensen & Meckling, 1976; Malagila et al., 2020).

Proper corporate governance practices could curtail opportunistic behavior, enhance decision-making, and reduce agency conflicts (Ataay, 2018). An example specific to football would be for clubs to enforce efficient governance mechanisms to align the interests of their directors and the clubs (Malagila et al., 2020). Good governance practices can potentially mitigate corruption scandals, power abuse, mistakes, and fraud (Schleifer & Vishny, 1997), and would be indispensable to ensure credibility, and legitimacy and to maximize earnings for sports entities (Zulch et al., 2020; Nazi & Amboni, 2020).

In 2010, the Union of European Football Associations (UEFA) adopted new regulations including financial fair play, driven by concerns about the long-term financial viability and sustainability of clubs (Assis, 2017; Szymanski & Weimar, 2019; Zulch et al., 2020). These regulations provide a framework to ensure the financial health of clubs and achieve a balance between sports and financial performance (Moraes et al., 2014).

In Brazil, government involvement in football began to increase in the 1990s, acting as an agent of change by implementing legal provisions to improve club structure and management (Nazi & Amboni, 2020). The Zico Law (Law No. 8672/1993) established general governance requirements for sports entities, whereas the Pelé Law (Law No. 9.615/1998) instigated consumer rights in sports and enforced accountability by sports directors. The 2003 Football Moralization Law mandates financial and administrative transparency and requires sports entities to disclose financial statements. The Timemania Law of 2006 allowed football clubs to pay tax and social security debts in installments.

In a further step forward, the enactment of Law No. 13,155 (herein referred to as PROFUT) sought to professionalize the management of Brazilian football clubs (Umbelino et al., 2019). PROFUT institutes principles of transparency and fiscal and financial responsibility and provides a process for recovering tax debts from the federal government within the realm of professional football entities (Rezende & Dalmácio, 2015; Umbelino et al., 2019). Aimed at promoting financial stability for Brazilian football clubs, PROFUT seeks to improve cash flow and resource management for investment, thereby improving sporting performance (Ferreira et al., 2023; Marotz et al., 2020).

To benefit from PROFUT, clubs must comply with a set of conditions imposed by the federal government, including publishing financial statements, establishing an independent fiscal council, maintaining regulatory compliance with federal labor and tax obligations, and limiting the advance of future revenues, among others (Marotz et al., 2019; Umbelino et al., 2019). It also holds managers and directors accountable for actions impacting club activities' financial health and continuity (Marotz et al., 2020). This legislation indicates a commitment from the government to control and regulate club activities, aiming to ensure the financial and social accountability of football club leaders (Silva et al., 2019). These issues suggest that, beyond simple debt refinancing for sports entities, PROFUT can also be perceived as an engine for implementing corporate governance practices in football clubs.

Governance in Brazilian football clubs is a relatively recent topic (Nazi & Amboni, 2020), sparsely covered in the literature (Ferreira et al., 2023), although it has been gaining increasing attention, particularly regarding the analysis of club financial management (Santana Filho et al., 2019). Regarding adherence to PROFUT, empirical studies highlight the quality of information disclosure and its impact on sports and financial performance (Marotz et al., 2020). For instance, Umbelino et al. (2019) suggested that adherence to PROFUT was insufficient in improving disclosure levels, and Ferreira et al. (2023) and Rocha et al. (2021) also suggested that clubs participating in PROFUT accrued higher levels of debt compared to non-participants, implying the program may not have enhanced the clubs' financial performance.

Conversely, Marotz et al. (2020) proposed that PROFUT improved training and athlete recruitment investment, thereby enhancing the clubs' net results and profitability. Aligning with this, Silva et al. (2019) suggest empirical evidence shows that the liquidity and debt ratios of three major football clubs in Minas Gerais—Atlético, América, and Cruzeiro—improved following their adherence to PROFUT. They caution, however, that it is not conclusive if this improvement is solely a result of the program since these clubs have continued to maintain high liability levels.

Santana Filho et al. (2019) suggest that adherence to PROFUT mitigated the decline in the first-division Brazilian championship clubs' financial performance but fell short of delivering the desired outcomes in relation to careless management. Similarly, Siqueira Junior and Oliveira (2018) propose that PROFUT participation positively impacted revenue, enhancing the financial performance of Brazilian football clubs. Consequently, in light of these observations, we presume that PROFUT enhances football clubs' management and financial performance and formulate the following hypothesis (Ferreira et al., 2023; Umbelino et al., 2019):

Hypothesis 1. Adherence to PROFUT improved financial performance in Brazilian football clubs.

In football, fans are not merely spectators but loyal consumers. Their relationship with the club is instrumental in the club's economic, sporting, and social success (Rezende & Dalmácio, 2015). Therefore, addressing these consumers' unique and diverse needs is critical for football clubs. Striking a balance between financial and sporting performance becomes necessary to meet these requirements (Dantas et al., 2015). This synergy between on-field success and off-field operations, such as team building and maintenance, is vital (Marotz et al., 2020). As measured by sports performance indicators, club performance in various competitions is tied to rankings, points, and winning tournaments (Umbelino et al., 2019; Rezende & Dalmácio, 2015).

Contrary to expectations, empirical studies, such as those conducted by Ferreira et al. (2023) and Umbelino et al. (2019), suggest that Brazilian clubs' adherence to PROFUT did not correlate with improved sports performance. Moreover, Marotz et al. (2020) failed to identify a correlation between financial and sporting performance, indicating a potential misalignment between the focus on on-field victory and financial stability. Conversely, Krüger et al. (2021) suggest that clubs ranked highly in the Brazilian Football Confederation might exhibit better financial performance. Additionally, studies by Santana Filho et al. (2019) and Siqueira Junior and Oliveira (2018) showed that adherence to PROFUT positively affected sporting performance. Based on these findings, we hypothesized that PROFUT's impacts on club management could enhance the sporting performance of football clubs (Ferreira et al., 2023; Umbelino et al., 2019), therefore:

Hypothesis 2. Adherence to PROFUT generated greater sporting performance in Brazilian football clubs.

3 Methodological aspects

To ascertain the impact of PROFUT on Brazilian clubs' financial and sporting performance, we utilized a descriptive research approach anchored in quantitative methods. Initially, our sample included 85 clubs that took part in the first, second, and third divisions of the Brazilian championship or ranked among the top sixty in the National Ranking of Clubs of the CBF, at least once between 2013 and 2018. Following this, we gathered accounting data directly from the clubs' websites, while sports performance metrics were acquired from the CBF website.

After reviewing the financial statements of these clubs, we discovered that complete data for 26 clubs was unavailable, and *Guaratinguetá Futebol Ltda.* had been exempted from official competitions in 2017, thus reducing our working sample. Consequently, our final sample was down to 58 clubs, or 340 observations. Once the final sample was fixed, we distinguished which clubs had and had not opted to participate in the PROFUT program. Initially, clubs had until November 30, 2015, to join PROFUT, but Law 13,262, enacted on March 22, 2016, extended the deadline to July 31, 2016. As a result, 41 clubs in our sample joined PROFUT, while 17 did not. Figure 1 lists the clubs in our sample, the divisions they participated in each year during the studied period, and which of them enrolled or did not enroll in PROFUT.

Figure 1

Sampled clubs, their divisions, and the study period (2013–2018)

Clubes	**13**	**14**	**15**	**16**	**17**	**18**	**Clubes**	**13**	**14**	**15**	**16**	**17**	**18**
ABC/RN	B	B	B	C	B	C	Grêmio/RS	A	A	A	A	A	A
América/MG	B	B	B	A	B	A	Guarani/SP*	C	C	C	C	B	B

Clubes	13	14	15	16	17	18	Clubes	13	14	15	16	17	18
Aparecidense*	B	C	C	C	C	D	Internacional/RS	A	A	A	A	B	A
Athletico Paranaense	A	A	A	A	A	A	Joinville/SC	B	B	A	B	C	C
Atlético Goianiense	B	B	B	B	A	B	Juventude/RS	D	C	C	C	B	B
Atlético Mineiro	A	A	A	A	A	A	Londrina/PR	D	D	C	B	B	B
ASA	B	C	C	C	C	D	Náutico/PE	A	B	B	B	B	C
Avaí	B	B	A	B	A	B	Mogi Mirim/SP*	C	C	B	C	C	D
Bahia	A	A	B	B	A	A	Oeste/SP*	B	B	B	B	B	B
Botafogo/RJ	A	A	B	A	A	A	Operário/PR*	N	D	N	D	C	B
Botafogo /PB*	D	C	C	C	C	C	Palmeiras/SP*	B	A	A	A	A	A
Botafogo /SP	D	N	D	C	C	C	Paraná Clube/PR	B	B	B	B	B	A
Bragantino*	B	B	B	B	C	C	Paysandu/PA	B	C	B	B	B	B
Brasil/RS	N	D	C	B	B	B	Ponte Preta/SP	A	B	A	A	A	B
Brasiliense	C	D	N	N	N	D	Portuguesa/SP*	A	B	C	C	D	N
Caldense*	D	D	D	D	D	D	Salgueiro*	D	C	C	C	C	C
Ceará	B	B	B	B	B	A	Santa Cruz/PE	C	B	B	A	B	C
Chapecoense*	B	A	A	A	A	A	Santo André/SP	D	N	N	N	N	N
Corinthians	A	A	A	A	A	A	Santos/SP	A	A	A	A	A	A
Coritiba	A	A	A	A	A	B	São Bento/SP	N	N	N	D	C	B
Criciúma*	A	A	B	B	B	B	São Caetano/SP*	B	C	D	N	N	N
Cruzeiro	A	A	A	A	A	A	São Paulo/SP	A	A	A	A	A	A
CSA	D	N	N	N	C	B	Sport Recife/PE*	B	A	A	A	A	A
Cuiabá*	C	C	C	C	C	C	Tombense/MG*	N	D	C	C	C	C
Figueirense	B	A	A	A	B	B	Tupi	C	C	C	B	C	C
Flamengo	A	A	A	A	A	A	Vasco da Gama	A	B	A	B	A	A
Fluminense	A	A	A	A	A	A	Vila Nova	C	B	C	B	C	C
Fortaleza	C	C	C	C	C	B	Vitória/BA	A	A	B	A	A	A
Goiás	A	A	A	B	B	B	Volta Redonda	N	N	D	D	C	C

Note. 13: year 2013. 14: year 2014. 15: year 2015. 16: year 2016. 17: year 2017. 18: year 2018. A: Serie A. B: Serie B. C: Serie C. D: Serie D. N: No series. *. Clubs that did not join PROFUT.

To examine the impact of adherence to PROFUT on financial performance (Hypothesis 1: Adherence to PROFUT improved financial performance in Brazilian football clubs) and sporting performance (Hypothesis 2: Adherence to PROFUT generated greater sporting performance in Brazilian football clubs), we categorized the clubs into two groups: the treatment group (i.e., clubs that adhered the program) and the control (i.e., those that did not). We then applied the differences-in-differences estimator (DID). This estimator allows us to discern whether clubs that engaged with PROFUT were more significantly affected than clubs that did not participate. Employing DID represents a significant improvement over previous studies, as it provides a more precise statistical analysis of PROFUT, considering the legal aspects of the program. This results in a sturdier comparison between participating and non-participating clubs by examining periods before and after the passing of Law 13,1555 for both cohorts. Additionally, our analysis considered that treated and control clubs possess different observable characteristics. To address this, we applied kernel propensity score matching (K-PSM), as recommended by Leuven and Sianesi (2014). This allows us to identify a club in the control group that matches a treatment club in all variables except for adherence to PROFUT. We generated two primary model variables to estimate the DID model with K-PSM.

The first ‘PROFUT Law’ refers to initiating the law that established the program, which significantly affects Brazilian club management. The period under consideration for this study was 2013–2018; 2013–2015 was identified as the ‘pre-PROFUT Law’ period (assigned the value ‘0’), and 2016–2018 as the period ‘during the PROFUT Law’ (assigned the value ‘1’). The second variable, ‘PROFUT treatment,’ refers to the two groups earlier classified as treatment and control. The treatment group, clubs that adhered to PROFUT and thus needed to comply with several legal requirements, was assigned the value ‘1,’ while the control group, clubs that refrained from adhering to PROFUT, was assigned ‘0.’ The multiplication of

'PROFUT Law' and 'PROFUT treatment' produced our independent variable, the DID estimator, as shown in Equation 1:

$$y_{i,t} = \delta_0 + \delta_1 PROFUT\ Law_t + \delta_2\ PROFUT\ treatment_i + \delta_3(PROFUT\ Law_t\ x\ PROFUT\ treatment_i) + \varepsilon_{i,t} \quad (1)$$

where i is the club, t is the time, $y_{i,t}$ is the dependent variable denoted by y-i,t, δ_1 aggregates factors that can engender changes in $y_{i,t}$ over time (even in the absence of PROFUT), δ_2 captures possible differences between pre-law treatment and control groups (shock), δ_3 captures the coefficient of interest, and ε_{it} is the error term. The δ_3 coefficient is calculated by subtracting the difference in the control group's adherence to PROFUT (non-adherence to PROFUT) before and after the introduction of the 'PROFUT Law' from the difference in the treatment group's adherence to PROFUT prior to and following the introduction of the 'PROFUT Law.' This calculation is outlined in Equation 2:

$$\hat{\delta}_3 = (\hat{y}_{PROFUT\ treatment,\ \ PROFUT\ Law\ =\ 1} - \hat{y}_{treatment\ PROFUT,\ \ PROFUT\ Law\ =\ 0}) - (\hat{y}_{control\ PROFUT,\ \ PROFUT\ Law\ =0} - \hat{y}_{control\ PROFUT,\ \ PROFUT\ Law\ =\ 0}) \quad (2)$$

In addition to the K-PSM estimation, the generalized least squares (GLS) method and probit models were utilized to delineate the effects of varied variables on financial and sporting performance. This model was primarily selected for two reasons: firstly, it allows for the capture of the heterogeneity of DID effects, and secondly, it contributes to the robustness of the results (Tristão & Sonza, 2021). Therefore, incorporating additional covariates into the DID model can bolster analysis efficiency by adjusting its randomization and reducing the variance of the error term (Roberts & Whited, 2013). These covariates are included within the model as detailed in Equation 3:

$$y_{i,t} = \delta_0 + \delta_1 PROFUT\ Law_t + \delta_2\ PROFUT\ treatment_i + \delta_3(PROFUT\ Law_t\ x\ PROFUT\ treatment_i) + \beta X_{igt} + \gamma_g + \lambda_t + \varepsilon_{i,t} \quad (3)$$

where i is the club, t is the time, $y_{i,t}$ is the dependent variable corresponding to financial performance (i.e., Hypothesis 1) or sports performance (i.e., Hypothesis 2), δ_3 is the DID estimator, βX_{igt} is the vector of covariates, γ_g and λ_t are the state and temporal effects, and $\varepsilon_{i,t}$ is the error term.

Our dependent variables represent financial and sports performance, and the control variables are size defined by the total assets of clubs fixed temporal effects, and fixed state effects. Table 1 presents the dependent and control variables, descriptions, and primary authors.

Table 1
Dependent and control variables

Variables	Authors	Description
	Financial Performance	
Indebtedness (IND) Indebtedness PROFUT (INDP)	Holanda (2015); Umbelino et al., (2019)	$END = \frac{(NCL + NNCL)}{TA}$ $ENDP = \frac{(OCLP + NOCLP)}{TA}$
Sales Revenue (SR) Logarthm of Sales Revenue (LSR)	Adapted Marotz et al., (2020)	$SR = Sales\ Revenue$ $LSR = ln\ (Sales\ Revenue)$

Variables	Authors	Description
Sales Revenue Diversification (SR DIV)	Adapted from Colla et al., (2020)	$SR\ DIV = \frac{SSI^{1} - \frac{1}{5}}{(1 - \frac{1}{5})}$
Sports Performance		
Ranking CBF (CBF) Ranking Variation (ΔCBF)	Ferreira et al., (2023); Umbelino et al., (2019)	$CBF = Score\ CBF$ $\Delta CBF = ScoreCBF_{i,t} - Score\ CBF_{i,t-1}$
Champion (CHAN)	Adapted from Danta et al. (2015)	*Dummy* equal to 1 if the club was champion in the year and 0 otherwise
Acess Libertadores (LIB) Access (ACES)	Umbelino et al., (2019); Dantas et al., (2015).	*Dummy* equal to 1 if there was classification for Libertadores (access) and 0 otherwise
Division (DIV)	Rezende and Dálmacio (2015), Umbelino et al., (2019)	Categorical Variable: 1 = Série A; 2 = Serie B; 3 = Série C; 4 = Serie D
Relegation (REL)	Dantas et al., (2015).	*Dummy* equal to 1 if the club was relegated in the year and 0 otherwise
Control Variables		
Size (TA)	Holanda (2015), Umbelino et al., (2019)	$LN\_TA = ln\ (Total\ Assets)$
Temporal Fixed Effects (TFE)	Sonza & Kloeckner (2014)	Categorical variable: encoding of the variable in numerical order (2013 to 2018).
State Fixed Effects (SFE)	Sonza & Kloeckner (2014)	Categorical variable: encoding of the variable in numerical order (16 states).

Note: [1]. $SSI = \left(\frac{BIR}{SR}\right)^2 + \left(\frac{SAGM}{SR}\right)^2 + \left(\frac{ATR}{SR}\right)^2 + \left(\frac{TR}{SR}\right)^2 + \left(\frac{SAR}{SR}\right)^2$, where: BIR = broadcasting and Image Revenue; SAGMR = Sponsorships, Advertising, Glove and Marketing Revenue; ATR = Athlete Transfer Revenue; TR = Ticket Revenue; SAR = Social Activity Revenue; SR = Sales Revenue; NCL = net current liabilities; NNCL = net non-current liabilities; OCLP = onerous current liabilities PROFUT; NCOLP = non-current onerous liabilities PROFUT; TA = total assets.

Additionally, to mitigate the impact of outliers, we winsorized the variables at the 1% and 99% percentiles of the distribution. All analyses were conducted using the Stata 14© software.

4 Results and discussions

We divided this section into two components for a clear analysis of the results: a) descriptive statistics and correlations and b) difference-in-differences estimations.

4.1 Descriptive statistics and correlation

To circumvent the multicollinearity problem, we checked the correlation between variables using the parameter of Hair et al. (2005), which considers a correlation above 0.70 unacceptable. Within this framework, only the variables CBF rank (CBF), division (DIV), sales revenue (SR), and size (SI) exhibited significant correlation with each other. Nevertheless, the variance inflation factor (VIF) did not confirm multicollinearity among these variables.

Beyond the general statistical description of the variables, it is crucial to comprehend the data behavior of both pre- and post-PROFUT, distinguishing between the treatment and control groups. Accordingly, we applied the Wilcoxon test to assess if there was a difference in the median of the variables within the treatment and control groups before and after the milestone. Table 2 provides the initial descriptive statistics for two periods (pre-PROFUT Law and during PROFUT Law) and the clubs that opted for PROFUT (treatment group) versus those that did not (control group).

The Wilcoxon test results suggest significant differences between the medians of the treatment group variables, indicating an impact of the PROFUT Law. However, this effect is not evident for the control group, where there is almost no significant difference between the medians. Specifically, one can observe significant differences in revenue diversification (SR DIV) and their underlying sources. Clubs that joined PROFUT concentrated their income more heavily on certain sources, as the SR DIV increased from 18% pre-Law to 23% post-joining.

When scrutinizing the sources composing total revenue, we observed significant differences among three of the five sources: image transmission revenues, advertising, and box office revenues. While the first demonstrated a median increase post-PROFUT, the latter two witnessed a decrease, contributing to a higher income concentration. Conversely, the median score obtained by clubs in the CBF ranking decreased post-PROFUT, albeit the relationship was insignificant.

In summary, the descriptive statistics indicate that clubs that adopted PROFUT are more indebted (46% compared to14%), generate higher revenue (690 million versus roughly 10 million), and diversify their revenue sources to a greater extent (0.23 compared to 0.35). They display a larger portion of revenue from image transmission (50% compared to 39%) and transactions with athletes (20% compared to 18%). However, they showed a smaller portion of revenue from advertising, signing bonus and marketing (12% compared to 15%), ticket sales (6% compared to 16%), and social activity revenue (10% compared to 11%).

Regarding the CBF classification, clubs that adhered to PROFUT have a superior score (6932 compared to 2988). Notably, the relationship between indebtedness and PROFUT indebtedness is striking, as clubs that adopted PROFUT saw their indebtedness grow from 32% of assets to 46%, whereas PROFUT indebtedness decreased from 31% to 30% (i.e., from an average of 57% to 43%).

Table 2
Descriptive statistics

Treatment group (adherence to PROFUT)													
	Pre-PROFUT						**Post-PROFUT**						**Wilconox**
Variable	**(n)**	**Mean**	**Med.**	**Min.**	**Max.**	**SD**	**(n)**	**Mean**	**Med.**	**Min.**	**Max.**	**SD**	
IND	82	0,72	0,32	0,00	19,00	2,22	102	0,72	0,46	0,00	12,8	1,42	*-1,92***
INDP	22	0,57	0,31	0,00	13,00	2,94	102	0,43	0,30	0,00	3,35	0,63	-
SR	80	1,37B	870M	4M	4,8B	1,3B	99	1,36B	690M	540Mil	5,23B	1,42B	0,36
SR DIV	70	0,30	0,18	0,04	1	0,28	86	0,35	0,23	0,05	1	0,26	*-1,78**
BIR	57	0,42	0,42	0,05	0,74	0,17	71	0,49	0,50	0,03	0,90	0,19	*-2,64****
SAGMR	63	0,23	0,18	0,02	0,98	0,20	80	0,19	0,12	0,02	0,98	0,22	*2,27****
ATR	59	0,20	0,17	0,00	0,57	0,14	73	0,21	0,20	0,00	0,62	0,14	0,14
TR	55	0,15	0,10	0,00	0,70	0,14	70	0,11	0,06	0,00	0,71	0,12	*2,93****
SAR	47	0,23	0,19	0,00	1,00	0,31	59	0,20	0,10	0,00	1,00	0,28	1,34
CBF	82	9286	10210	153	16208	4615	102	7843	6932	459	15288	4401	0,99
Control group (non-adherence to PROFUT)													
	Pre-PROFUT						**Post-PROFUT**						**Wilconox**
Variable	**(n)**	**Mean**	**Med.**	**Min.**	**Max.**	**SD**	**(n)**	**Mean**	**Med.**	**Min.**	**Max.**	**SD**	-0,60
IND	31	0,71	0,22	0,00	7,41	1,44	39	0,92	0,14	0,00	14,93	2,52	-
INDP	0	0,00	0,00	0,00	0,00	0,00	0	0,00	0,00	0,00	0,00	0,00	1,00
SR	31	539Mi	126Mi	34Mil	3,9Bi	929Mi	39	593Mi	9,75Mi	34Mil	5,23Bi	1,27Bi	0,68
SR DIV	20	0,48	0,37	0,05	1,00	0,31	27	0,39	0,35	0,03	1,00	0,27	0.43
BIR	16	0,46	0,51	0,00	0,73	0,25	18	0,43	0,39	0,00	0,86	0,24	-0,35
SAGMR	20	0,27	0,13	0,00	1,00	0,35	27	0,25	0,15	0,00	1,00	0,24	*-1,95***
ATR	17	0,09	0,03	0,00	0,47	0,14	21	0,29	0,18	0,00	0,80	0,26	0,27
TR	19	0,27	0,14	0,00	0,98	0,28	25	0,24	0,16	0,04	1,00	0,26	*1,71**
SAR	3	0,23	0,23	0,21	0,25	0,02	5	0,08	0,11	0,00	0,16	0,08	-0,23
CBF	29	5448	4781	625	14256	3237	39	4533	2988	567	15288	3702	-0,60

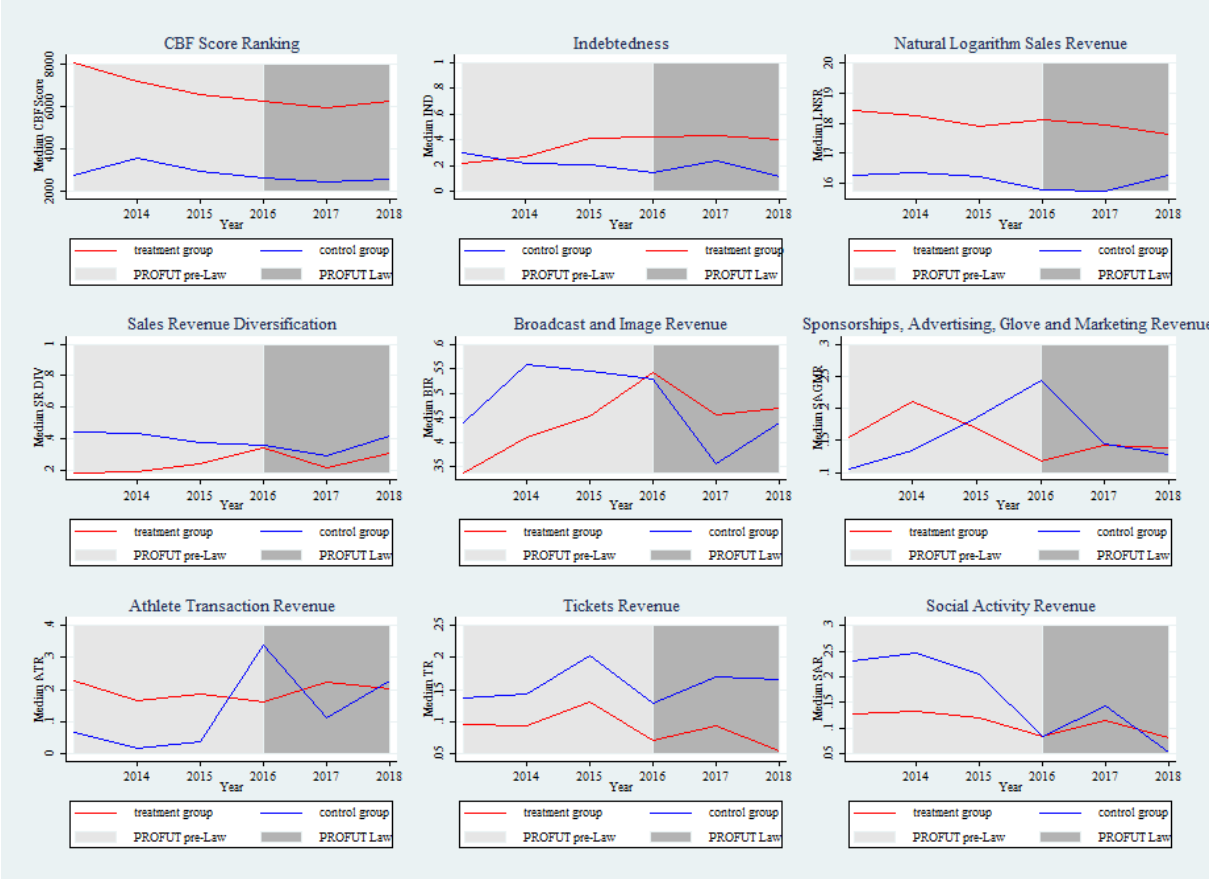
Note: (n) = number of observations; Med = median; Min. = minimum; Max. = maximum; SD = standard deviation; B = billions, M = millions; IND = indebtedness; INDP = PROFUT indebtedness; SR = sales revenue; SR DIV = sales revenue diversification; BIR = image transmission revenue; SAGMR = = advertising, publicity, signing bonus and marketing revenue; ATR = athlete transaction revenue; TR = tickets revenue; SAR = social activity revenue; CBF = CBF ranking score. ***, ** and * represent significance at 1%, 5% and 10%, respectively.

We conducted tests to fit the model. The multivariate normality test, according to Mardia et al. (1979), exhibited statistical significance at the 1% level for univariate, bivariate, and multivariate normality. However, Wooldridge's autocorrelation test failed to show significance at the 5% level, suggesting the presence of data autocorrelation. The statistically significant results of the Breusch-Pagan (1979) and Cook-Weisberg (1983) tests indicated heteroscedasticity within the model. Consequently, we generated robust estimators in all the econometric models.

4.2 Difference-in-Differences model estimation

Having described the statistical data, we proceed to graphically analyze key variables' behavior in relation to PROFUT adherence. Figure 2 presents this graphical analysis, which generally suggests that clubs that join the program do not immediately experience any significant impact on their athletic performance, as represented by their points in the CBF ranking. Similarly, the graph depicts that debt levels remain steady over time. Conversely, adherence to PROFUT seems to have noticeable effects on financial performance, particularly in terms of sales revenues and their underlying structure.

Figure 2
Graphical analysis



Specifically, the graphic analysis reveals that clubs prioritized their revenue capture, focusing on profits from image transmission, advertising, publicity, signing bonus and marketing, athlete transactions, box office receipts, and social activities. However, to infer this impact, it is necessary to perform the difference in differences estimation with covariates. We evaluated the sporting and financial efficiencies by comparing clubs from the treatment and control groups before and during the implementation of the PROFUT Law using KPSM to

estimate the DID. Table 3 lists the DID models relating to financial and sports performance variables, indicating significant differences between the groups.

Table 3
Financial and sports performance –kernel propensity score matching difference-in-differences

Financial performance - Hypothesis H1											
	Before				**After**				**Difference in differences**		
Model	*Con.*	*Trea.*	*Diff*	**t**	*Con.*	*Tra.*	*Diff*	**t**	**DID**	**t**	**Obs**
IND	0,62	0,70	0,08	0,09	1,37	1,61	0,24	0,33	0,16	0,14	221
ΔIND	0,20	-0,46	-0,66	-0,64	0,10	-0,67	-0,77	1,10	-0,11	0,09	178
LSR	17,81	18,83	0,42	1,25	16,13	17,81	1,67	**5,73*** **	1,25	**2,79*** **	220
SR DIV	0,46	0,32	-0,14	**-2,33** **	0,22	0,36	0,13	**2,65*** **	0,28	**3,48*** **	218
BIR	0,47	0,41	-0,05	-0,93	0,37	0,49	0,12	**3,52*** **	0,18	**2,61*** **	161
SAGMR	0,16	0,23	0,08	1,69	0,25	0,22	-0,03	0,94	-0,11	**-1,89***	201
ATR	0,10	0,23	0,12	**3,23*** **	0,24	0,21	-0,020	0,59	-0,14	**-2,81*** **	177
TR	0,44	0,17	-0,27	**-5,20*** **	0,19	0,12	-0,07	1,46	0,20	**2,74*** **	171
SAR	0,23	0,28	0,06	0,57	0,03	0,18	0,16	**3,00*** **	0,09	0,78	89
Sports performance - Hypothesis H2											
	Before				**After**				**Difference in differences**		
Model	*Con.*	*Tra.*	*Diff*	**T**	*Con.*	*Tra.*	*Diff*	**T**	**DID**	**t**	**Obs**
CBF	4016	7482	3466	**5,07*** **	6442	6864	422	*0,65*	-3044	**-3,24*** **	337
ΔCBF	-327	-217	109	0,54	497	-110	-607	**-4,25*** **	-717	**-2,88*** **	246
CHAN	0,35	0,39	0,04	0,50	0,40	0,40	0,00	0,06	-0,04	0,34	291
LIBERT	0,00	0,34	0,34	**3,18*** **	0,45	0,31	-0,14	1,20	-0,48	***-3,03*** **	111
ACESS	0,72	0,39	-0,32	***-1,85****	0,01	0,28	0,27	**2,52*** **	0,60	***2,90*** **	79
REL	0,27	0,11	-0,16	***-2,33****	0,03	0,15	0,11	**1,96** **	0,27	***3,04*** **	239
DIV	1,85	1,65	-0,20	-0,96	2,78	1,95	-0,82	**4,56*** **	-0,61	**-2,20** **	248

Note: IND = indebtedness; ΔIND = change in indebtedness ($\Delta IND_{i,t} = IND_{i,t} - IND_{i,t-1}$); LSR = Neperian logarithm of sales revenue; ; SR DIV = Sales revenue diversification; BIR = image transmission revenue; SAGMR = advertising, publicity, signing bonus and marketing revenue; ATR = athlete transaction revenue; TR = tickets revenue; SAR = social activity revenue; CBF = points referring to the CBF ranking; ΔCBF = points variation referring to the CBF ranking ($\Delta CBF_{i,t} = CBF_{i,t} - CBF_{i,t-1}$); LIBERT = LIBERT = Libertadores da América classification; REL = relegation; SD represents standard deviation; t represents the Student t-test. Regressions were estimated using KPSM. The covariates are the variables representing financial and sports performance. ***, **, and * represent significance at 1, 5, and 10%, respectively.

Regarding financial performance, results from the initial DID model indicate that adhering to PROFUT significantly impacts the revenue of Brazilian football clubs (Table 3). The difference in treatment effect on clubs that adhered to the program versus the control effect on those that did not (represented by the DID estimator) is statistically significant in all models associated with revenue, except for social activity revenue. The DID estimator displays a considerable 1% significance, suggesting a positive effect on image transmission and ticket revenue. These findings, which corroborate the findings of Siqueira Junior and Oliveira (2018), suggest that PROFUT membership positively impacts revenue levels, thereby enhancing Brazilian football clubs' financial performance.

Similarly, the DID estimator is significant in the 1% model for the revenue diversification variable, noting that clubs enrolled in PROFUT would likely have more concentrated revenue. These findings are novel compared to prior research since they account for the complexity and uniqueness of football club incomes. Krüger et al. (2021) suggested that a club's revenue is related to its size and the leagues in which it competes. The correlation

between the leagues Brazilian teams play in and the findings of the DID models also suggest revenue concentration among PROFUT member clubs.

However, the impact of PROFUT membership on clubs' revenue structure varies. The DID coefficient produces significant results for models with athlete transfer revenue (1%) and advertising, publicity, signing bonus, and marketing revenue (10%), indicating negative effects. These results hint that enrolling in PROFUT might reduce a club's advertising, program income, and player sales. Moreover, the DID estimator is not substantial in relation to models for indebtedness, which necessitates additional discussion regarding PROFUT's efficacy in improving management practices and reducing the debt of Brazilian football clubs.

These findings align with Ferreira et al. (2023), Rocha et al. (2021), Santana Filho et al. (2019), and Umbelino et al. (2019), as these studies suggested that PROFUT membership did not enhance the financial performance of football clubs, as they continued to maintain high levels of debt compared to non-member clubs. This raises questions about PROFUT's efficacy in promoting financial stability, necessitating a broader evaluation of the program and its oversight mechanisms. Partially, our results indicate that hypothesis H1 of this study should not be rejected, as PROFUT membership improves financial performance when considering sales and ticket revenue, along with revenue diversification for Brazilian clubs.

In terms of sports performance (Table 3), PROFUT membership is shown to negatively impact most variables representing sports performance. The DID estimator showed that participating in PROFUT decreases clubs' likelihood of qualifying for the highest competition in Latin America and increases their relegation risks, excluding them from Brazil's first-division league. These results reinforce the findings of Ferreira et al. (2023) and Umbelino et al. (2019), who suggest stronger sporting performance is not a result of PROFUT membership. Marotz et al. (2020) suggest that the aspiration for on-field success is not aligned with the fiscal health of clubs. Consequently, Hypothesis 2, which proposed PROFUT adherence positively impacted sporting efficiency, is refuted.

To supplement the primary analysis, we estimated models using covariates within the standard DID structure by employing the GLS and probit methods. Table 4 provides the results of GLS and probit estimates using covariates. Overall, the results of both the GLS and probit models concur with those of the difference-in-differences models. However, the DID estimator does not significantly impact clubs' indebtedness, reinforcing the idea that while PROFUT membership might enhance a club's financial performance regarding revenue, it does not appear to effectively curb Brazilian clubs' indebtedness.

Table 4 - *Generalized least squares (GLS) and probit estimation with covariates*

Model	IND[1]	ΔIND[1]	LSR[1]	SR DIV[1]	BIR[1]	SAGM[1]	ATR[1]	TR[1]	SAR[1]	CBF[2]	ΔCBF[2]	CHAN[2]	SER[2]	LIB[2]	ACES[2]	REB[2]
DID	-0.06	-0.09	**0.33**	**0.08**	**0.07**	0.01	**-0.14**	**-0.12**	0.07	**-733**	-201	0.31	**-0.27**	**-0.11**	-0.04	0.08
T	-0.06	-0.11	**2.90*** **	**2.11** **	**2.71*** **	0.22	**-2.63*** **	**-2.44*** **	1.38	**-2.03** **	-0.98	0.94	**-2.29*** **	**-1.66***	-0.56	0.98
CBF	-0.00	**0.00**	**0.00**	-5.81	-5.59	-0.00	-9.44	5.33	-7.90	-	-	0.00	**-0.01**	**0.00**	-5.73	**-0.00**
t	-0.38	**1.95** **	**5.31*** **	-1.47	-0.76	-1.52	-0.14	0.75	-1.44	-	-	1.05	**-6.90*** **	**2.93*** **	-0.43	**-1.94** **
DIV	**1.58**	**0.79**	**-0.46**	**0.04**	-0.01	0.02	0.01	0.02	0.01	**-1375**	**-353**	-0.03	-	0.02	0.03	**-0.08**
t	**2.85*** **	**1.85***	**-7.69*** **	**2.43*** **	-0.43	0.96	0.40	0.55	0.81	**-6.72*** **	**-3.71*** **	-0.23	-	0.52	0.82	**-2.07** **
CHAN	0.02	-0.15	**0.13**	-0.00	0.03	-0.02	-0.02	-0.02	0.00	-20.35	**319**	-	-0.01	**0.10**	-0.02	0.06
t	0.03	-0.26	**2.53*** **	-0.12	0.92	-0.80	-0.51	-0.63	-0.90	-0.11	**2.41*** **	-	-0.20	**2.34*** **	-0.48	1.15
LIB	0.48	-0.37	**0.14**	-0.01	-0.04	0.00	0.01	0.01	0.00	**1528**	227	**-0.52**	**0.22**	-	-	-0.11
t	0.51	-0.42	**2.05** **	-0.49	-1.00	0.09	0.24	0.38	0.20	**5.07*** **	1.17	**-1.66***	**2.14** **	-	-	-1.33
ACES	1.02	**-1.64**	0.01	-0.02	0.01	-0.02	-0.02	-0.04	-0.02	**-1370**	**-394**	-0.19	**-0.42**	-0.07	-	**-0.16**
t	0.21	**-1.87***	0.11	-0.99	0.14	-0.52	-0.51	-0.89	-0.78	**-5.60*** **	**-2.28*** **	-0.67	**-5.32*** **	-1.07	-	**-2.04** **
REL	1.00	-0.11	-0.06	0.03	-0.02	0.03	-0.01	0.02	-0.00	**1322**	256	-0.24	**0.55**	**-0.12**	**0.25**	-
t	0.56	-0.06	-0.86	1.34	-0.49	0.77	-1.56	0.54	-0.38	**4.63*** **	1.35	-0.81	**6.28*** **	**-1.82***	**3.41*** **	-
SR	**0.23**	-0.45	-	-0.04	-	-	-	-	-	**738**	**-162**	**0.21**	**-0.11**	0.04	-0.03	0.01
t	**1.85***	-1.40	-	-1.46	-	-	-	-	-	**5.72*** **	**-2.74*** **	**2.40** **	**-2.68*** **	1.36	-0.97	0.23
TA	-	-	**0.14**	-	-	-	-	-	-	**472**	**-160**	-	0.03	-0.01	0.03	0.00
t	-	-	**3.55*** **	-	-	-	-	-	-	**4.08*** **	**-3.38*** **	-	0.99	-0.60	1.37	0.22
ΔIND	-	-	**-0.01**	-0.00	**-0.07**	0.00	-0.01	-0.01	0.00	28.13	-14.83	-0.01	**0.02**	-0.00	**-0.01**	-0.00
t	-	-	**-2.93*** **	-0.29	**-2.07** **	1.48	-0.82	-0.82	1.60	1.13	-0.89	-0.74	**4.51*** **	-0.06	**-2.14** **	-0.08
R^2	13.43%	3.71%	52.37%	14.73%	6.13%	4.79%	25.06%	27.93%	22.24%	29.60%	22.43%	14.12%	51.00%	8.23%	15.96%	10.54%
SFT/TFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	250	200	163	163	132	154	138	137	97	200	189	213	217	200	200	200

Note: (1)- Financial performance variables; 2- Sports performance variables; DID is the difference-in-difference estimator, obtained by regressions in Table 3 IND = indebtedness; ΔIND = change in indebtedness (ΔI〖ND〗_(i,t)=〖IND〗_(i,t)-〖IND〗_(i,t-1)); LSR = logarithm of sales revenue; SR DIV = Sales Revenue Diversification; BIR = image transmission revenue; SAGMR = advertising, publicity, signing bonus and marketing revenue; ATR = athlete transaction revenue; TR = tickets revenue; SAR = social activity revenue; CBF = points referring to the CBF ranking; ΔCBF = points variation referring to the CBF ranking (Δ〖CBF〗_(i,t)=〖CBF〗_(i,t)-〖CBF〗_(i,t-1)); CHAM = champion; LIB = Libertadores da América classification; REL = relegation; TIT = Title; ACCES = access; DIV = division; t represents the t-test. The covariates are the variables representing financial and sports performance. t is the Student t-test, R^2 is the coefficient of determination; and SFE and TFE represent state-fixed and temporal-fixed effects, respectively. *, **, and *** indicate statistical significance at 10, 5, and 1%, respectively..

The results from the GLS and probit models indicate that adherence to PROFUT does not necessarily ensure superior sports performance. This is evident from the significant DID coefficient in the model with the CBF ranking (5%), the Brazilian championship division in which the club competes (1%), and access to the Copa Libertadores da América (10%). In all three cases, the effect is negative. A combined analysis of the outcomes from the DID, GLS, and probit models infers that by joining PROFUT, the club‘s management is signaling an intent to modernize management decisions. Such a decision could generate interest from stakeholders such as fans, businessmen, investors, and the government, creating a conducive environment around the club to boost revenue. Nevertheless, PROFUT membership is a disadvantage for the clubs, demonstrating a disparity between their financial and sports performance. For instance, the club typically realizes immediate financial gain when a key player is sold. However, it also suffers the loss of that player’s technical quality, which may negatively impact performance on the field.

5 Conclusions

The findings from our primary difference-in-differences models suggest that PROFUT adherence boosted total revenue for clubs, especially affecting ticket sales and broadcasting proceeds, while also concentrating on the revenue structure. This corroborates research conducted by Santana Filho et al. (2019) and Siqueira Junior and Oliveira (2018), showing an enhancement in the financial performance of clubs that joined PROFUT, primarily via revenue increase. Nonetheless, no significant relationship was found between the program’s adherence and the clubs’ debt levels, which aligns with Santana Filho et al. (2019) and suggests that PROFUT was ineffective in resolving debts and did not produce the desired results in addressing careless club management. Our complementary generalized least squares and probit models confirm these findings, strengthening the idea that PROFUT membership improved club revenues.

Additionally, the results confirm those of Ferreira et al. (2023) and Umbelino et al. (2019); both our primary (DID) and complementary (GLS and probit) models indicated that PROFUT negatively impacted the sporting performance of Brazilian clubs. This suggests that PROFUT membership alone does not guarantee a balance between financial income and sporting success. Selling skilled and increasingly younger players to European and Asian markets may indicate priorities toward financial sustainability over championship pursuit (Santana Filho et al., 2019).

Our empirical evidence adds to the discussions on corporate governance within football club administration. Beyond exploring the effects of PROFUT membership on club revenue, our results imply that these clubs tend to diversify their income sources. Similarly to Ferreira et al. (2023) and Rocha et al. (2021), our research did not demonstrate a significant influence of PROFUT on the clubs‘debt levels, an insight that could be useful to club managers and regulatory bodies to review PROFUT’s objectives.

It should be noted that this study might exhibit some endogenous causality, as it was limited by the availability of data from online sources of clubs and federations. Lastly, we suggest that future research could explore compliance with legal requirements for continued PROFUT membership and the incorporation of corporate governance variables.

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