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Competitive Human Capital and Football Club's Performance: Case of the English Premier League

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Abstract. The objective of this study is to examine the interrelation between competitive human capital (CHC) and a professional football club's (PFC) sports performance (SP) and business performance (BP). The research methodology is based on a seemingly unrelated regressions (SUR) model with panel data. Empirical results are tested on data of the 41 PFCs in the English Premier League (EPL) for the period of 2008–2023. We find that CHC has a positive impact on SP and on the intensity of stream of broadcasting revenue (BR) as the main driver of PFC revenue, but it has a negative impact on BP. Additionally, the results indicate that the media interest in PFC has a limited financial impact, and the financial aspects of a transfer policy are secondary to the club's ability to generate revenue, while CHC expenses reduce PFCs' business efficiency, profitability, and liquidity. PFCs should focus on balancing between SP and BP by optimizing transfer and wage expenditures. Furthermore, given UEFA's requirements for settling overdue payables, clubs should take measures to increase liquidity. This paper contributes to the field by applying a SUR model in the context of SP and BP of PFC as a for-profit entity (with an emphasis on the influence of CHC on the intensity of stream of BR), which is a relatively novel research avenue. It can act as a foundation for studying the impact of CHC parameters on PFCs' sports, business, and financial performance as a virtuous cycle of performance.

Keywords: broadcasting revenue, business performance, competitive human capital, professional football club, sports performance.

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1. Introduction

Nowadays, football it is not just a game, sport, and entertainment. Ruberti (2024) states that the attitude to the European football market as a win-maximisation league is an old-fashioned prejudice. Leach and Szymanski (2015) also believe that a view, which is widely held in Europe, that a *Professional Football Club* (PFC) is not run on a profit-maximising basis, is factually incorrect, but it still affects revenue sharing between leagues and clubs. In fact, European football clubs are rational economic agents who fail to maximise profit due to agency conflicts (Ruberti, 2024). The hypercompetitive environment in which PFCs exist due to the promotion and relegation system is another explanation for why they generate negligible profits and are always close to insolvency (Szymanski, 2017). To compete at the highest level, any PFC must ensure the business's financial viability, which depends on the ability to generate revenue streams sufficient for investing in the team as the most competitive part of its human capital.

The fundamentals of PFCs' business model are in the competition for the best talents, since *Competitive Human Capital* (CHC) as a team may create sustainable sports performance differences, which may enhance PFCs' financial performance (Gerrard & Lockett, 2018). COVID-19 lockdown encouraged PFCs to accelerate searching for new business strategies that are fuelled by modern technological solutions of TV-media broadcasting and digital media producers (De & DCruz, 2023). As a result, the English Premier League (EPL) as the most competitive professional football league in the world sells rights to broadcast its matches to 188 countries[1], and its *Broadcasting Revenue* (BR) has been consistently exceeding 50% of the total revenues since 2009 (Cox & Philippou, 2022). At the same time, professional failure reduces the interest of stakeholders in PFC, which increases the financial risks of its existence due to the insufficient revenue to cover expenses, primarily on CHC. Therefore, the qualitative development of professional football requires a comprehensive study of the role of CHC in *Sports Performance* (SP) and *Business Performance* (BP) of PFC as components of its successful functioning.

The originality of our approach lies in the formulation of three interrelated hypotheses about the relationship between CHC and SP and BP of PFC as a for-profit entity (with a focus on the impact of CHC on the intensity of the stream of BR as the main source of revenue) and their simultaneous evaluation using the *Seemingly Unrelated Regressions* (SUR) model.

The research aims to examine the interrelation between CHC and PFC's SP and BP. For the purpose of the article, research questions are to determine the direction and power of influence of individual CHC's characteristics on PFC's SP and BP, including the intensity of stream of BR, while taking into account the financial viability of PFC. The subject scope of the research includes PFCs which played in the EPL at any time within a timeframe of 2008–2023. We used *Stata MP 13* to process the data on the PFCs' performance and their

[1] McCaskill, S. (2024, November 28). *Next stop, Premflix? Why the Premier League is bringing media production in house*. SportsPro. Retrieved from: https://www.sportspro.com/insights/analysis/premier-league-media-production-img-plp-split on February 3, 2025.

CHC. The results of our study will contribute to improving sports results and increasing the efficiency of the business side of football against the backdrop of the changing model of generating club's revenues and the UEFA Club Licensing and *Financial Sustainability Regulations* (FSR) (2022) by optimizing CHC management.

In the next section, we will conduct the literature review and hypotheses development. Then, we will describe the research methodology, namely, sample and data collection, variables, research design, and method. Next, we will present the results and discussion. Finally, we will close with conclusions.

2. Literature Review and Hypotheses Development

The key dimensions of PFCs' performance are a set of relationships in the so-called virtuous cycle of performance: SP influences revenues (BP), which impact the financial performance that affects SP (Lago et al., 2004). However, in the empirical literature, the study of the relationship between financial performance and SP prevails (Miragaia et al., 2019; Arsu, 2021). At the same time, financial viability of PFCs impacts football success only partially (Georgievski et al., 2024), and financial performance influences the sports results in a specific way, since PFCs are encouraged to follow the profit maximization (Di Simone & Zanardi, 2020). Meanwhile, a key to superior SP of a PFC is CHC (team), which is a source of sustainable competitive advantage from the resource-based view (Miragaia et al., 2023). Despite the fact that the human capital recurrent mobility (Lanza & Simone, 2024) and the temporality of the team composition are inherent in professional football (Massaro et al., 2020), the business side of football requires performance persistence from CHC (Gerrard & Kringstad, 2022). Therefore, identifying CHC characteristics essential for the comprehensive management of PFCs' performance and determining their impact on the key indicators of PFC functioning will ensure the stable effectiveness of its performance as the for-profit entity.

Tuncdogan et al. (2023) note that current studies on the impact of human capital on PFC's results focus on the effects of the team's characteristics on its performance. The indicators connected to the age of players are the most common factors related to CHC that affect individual and team sports results (Gerrard & Lockett, 2018; Tuncdogan et al., 2023) and a transfer market value (Kalén et al., 2019; Metelski, 2021).

A team's market value is the most popular value characteristics of CHC for assessing PFC's SP (Franceschi et al., 2024a). It is an expected total value of a PFC's players in a free market formed by experts of football portals (e.g., Transfermarkt.de, Marca.com, Kicker.de, etc.). Due to open access, the possibility of determining it for different seasons and taking into account home-grown players, this conditional value of CHC of PFCs is studied for the factors of its formation (Metelski, 2021 and connection with the club's performance. Lanza and Simone (2024) proved that players' market value is an effective proxy of human capital value and noted its impact on the team's sports achievements. Hamdi et al. (2024) revealed a strong positive correlation between SP and market value in European football clubs, while Plumley et al. (2018) state that, in English football, the

distribution of BR is heavily biased towards the EPL, which includes six of the TOP 10 most valuable PFCs[2].

Players' services secure PFC's future economic benefits through their on-field performance (Franceschi et al., 2024b). Their registration (or transfer) cost is intangible investments, which are affecting both PFC's sports (as winning percentage) and financial performance (as turnover) (Mnzava, 2013). PFCs reflect players' registration cost as an intangible asset but at their historical cost with amortization during the term of contract (Wilson & Plumley, 2018), whilst the costs on home-grown players are expensed (Maroun et al., 2022). This causes discrepancies between the team's market value and the net book value of the club's player rights (Martín Lozano & Carrasco Gallego, 2011). In such circumstances, PFCs require new ways of evaluating the potential return of player transfers to lower the risk of failed player investments (Užík et al., 2022).

An integral part of building an effective team is the recruitment and selection process in which PFCs invest vast amounts of money. Although prices of players are formed on the basis of their performances over the last year, the PFC's behaviour in the transfer market provides an idea of the approaches to implementing its strategy, financial condition and potential for investment (Poli et al., 2024). In particular, Di Domizio et al. (2024) state that the financial sustainability strengthens the PFC's position during negotiations regarding the players' transfer value.

Financial success of Europe's elite PFCs is driven by national and international sporting success, which, in turn, is driven by team transfer investments (Rohde & Breuer, 2016a). Jagielski (2022) does not reject the causal relationship between transfer spending values and SP (points and standings), but notes its low strength for selected European PFCs. Leifheit and Follert (2023) established that the players' transfer values (PFC's expenditure on CHC transferring) influence by share of sporting success, salary, or merchandising potential, when PFCs aim for the highest possible transfer sums through the players' sale (PFC's income from CHC transferring). As a result, overinvestment in European professional football led to low profitability, wages outgrowing revenues, and high debt levels (Rohde & Breuer, 2016b).

2.1. Competitive Human Capital in Professional Football Club's Sports Performance

As a driver of economic growth and a source of funding for PFCs' investments, relative on-field productivity of a team (Hamdi et al., 2024) is correlated with: the goals scored by the club to the goals scored against it and the wins to the total played matches (Abbas, 2023); ranking positions at national and champions leagues (Di Domizio et al., 2024; Di Simone & Zanardi, 2020); points gained divided by the maximum attainable points

[2] Transfermarkt. (2025). *100 most valuable teams in the world*. Retrieved from https://www.transfermarkt.co.uk/vereins-statistik/wertvollstemannschaften/marktwertetop?kontinent_id=0&land_id=0&plus=1 on January 18, 2025.

(Gerrard & Lockett, 2018); result of the game (i.e., either a win, a draw, or a loss) and the difference between scored and conceded goals, on a game basis (Lanza & Simone, 2024).

At the same time PFCs can compete in a number of sporting competitions: the domestic league, the FA Cup, the League Cup, the UEFA Cup, and the Champions' League (Leach & Szymanski, 2015). Therefore, the more games a team plays in a season, the greater its sporting progress outside of national league competitions. At the same time, the league position serves as an objective measure of PFC's SP, which characterizes the success of the CHC of the club relative to its competitors based on the results of a constant number of games (Carmichael et al., 2011), and also affects PFC's financial performance (Wislon et al., 2013).

Thus, based on the above discussion, we hypothesise:

H1: Competitive human capital has positive effects on sports performance of a professional football club as a for-profit entity.

2.2. Competitive Human Capital in a Professional Football Club's Business Performance

Since a successful team is expensive in the long run (Užík et al., 2022), this affects the future of PFC as a for-profit business entity. Galariotis et al. (2018) argue that BP of PFCs (more revenues) affects sports achievements positively and vice versa, while financial performance affects SP in a one-way inverse relationship. It means that higher revenues do not aid financial performance given the inherent-to-the-sport pursuit of short-term objectives to the detriment of long-term sustainability (Galariotis et al., 2018) due to an inflation of CHC costs (Dimitropoulos & Scafarto, 2021).

Player and coach contracts provide for a system of bonuses for game-by-game results and performance, attaining titles or certain positions in competitions. Therefore, a higher wage is likely to lead to better SP in terms of league ranking (Leach & Szymanski, 2015; Schloesser & Adamec, 2023). However, lower SP and a lower revenue do not inherently translate into significantly lower wages and payrolls (Andreff, 2018). The growth of PFCs' wage expenses is also associated with superstar wage effects, which are explained by the talent and productivity (Rosen, 1981) or popularity of individual players (Adler, 1985; Carrieri et al., 2018). The concentration of highly paid CHC in professional football leads to the fact that wages constitute the majority of PFCs' expenses, which, under the conditions of financial deficits, are financed by a high leverage debt (Peeters & Szymanski, 2014). This leads to a decrease in their ROA or even the appearance of losses (Ribeiro et al., 2022). Thus, for PFCs, a wage-to-revenue ratio is not only a measure of financial prudence (Alabi & Urquhart, 2023) and efficiency of BP (Perechuda, 2019), but also the object of the cost control rule of the UEFA.

Consequently, based on the preceding discussion, we hypothesise:

H2: Competitive human capital has positive effects on efficiency of business performance of a professional football club as a for-profit entity.

2.3. Competitive Human Capital in a Professional Football Club's Broadcasting Revenue

The team's professional achievements act as a powerful emotional stimulus for financial interest in PFC from investors (Supino et al., 2024), fans (Abbas, 2023), sponsors (Górecka, 2020), and the media (Duncan, 2018), which determines its ability to generate differentiated revenue streams (Schloesser & Adamec, 2023). Due to telecommunication technologies, sports organizations have provided sports competitions with a status of world-class spectacles (Schultz & Wei, 2013), and the monetization of their popularity has made BR the main type of revenue for PFCs. These trends have been intensified due to the adverse effects of the global pandemic on other revenue sources, and therefore clubs rely on BR more than ever (Özaydın, 2022).

The collective sale of broadcasting rights by the EPL central body aims to maximise profits compared to selling live games by individual clubs, which can focus on sporting achievements (Cox, 2012). Since the distribution of BR is determined by the final league positions (merit payment) and the number of television appearances (facility fees), this shows the impact of CHC's sporting success and popularity among the stakeholders on PFC's BR. As a result, the intensity of the stream of BR causes an imparity in the talent distribution and win-wage relationship experienced by the top teams and the remainder (Bishop et al., 2022).

Thus, we hypothesise:

H3: Competitive human capital has positive effects on the intensity of stream of broadcasting revenue of a professional football club as a for-profit entity.

3. Research Methodology

3.1. Sample and Data Collection

The hypotheses were tested with the data of 41 clubs which, anytime between 2008–2023, played in the most competitive and financially successful professional football league in the world – the EPL. For this purpose, the PFC-level panel dataset was created, financial statements and notes to the financial statements were manually retrieved from the clubs' annual reports; the reports are published by the Companies House (https://find-and-update.company-information.service.gov.uk/), as well as the data on their SP, market value, average age of players, transfer income and transfer expenditures, which are provided on Transfermarkt (https://www.transfermarkt.co.uk/). The final sample consists of 317 club-year observations due to the lack of financial reporting of Portsmouth F.C. for the seasons of 2008/2009 and 2009/2010, as well as the lack of transfer expenditures in Tottenham Hotspur F.C. in the 2018/2019 season.

The 2008–2023 period was selected for analysis due to its structural consistency and relevance: the sharp increase in broadcasting revenue from 2008 marked the beginning of a new era of financial and competitive capacity for EPL[3], while regulatory changes initi-

[3] Deloitte. (2008, February). *Football Money League: Gate receipts.* Retrieved from https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Audit/gx-deloitte-football-money-league-2008.pdf on July 07, 2025.

ated in 2023 aim to reshape the financial behaviour through stricter rules on profitability and sustainability[4]. These boundary points offer a stable and comparable timeframe for assessing the long-term effects of human capital strategies.

3.2. Variables

Dependent variables

We conducted a concurrent evaluation of the impact of CHC on PFCs' SP and BP (Galariotis et al., 2018). The ranking position at the domestic league was chosen as the club's on-field productivity (Carmichael et al., 2011; Di Simone & Zanardi, 2020), while, for BP, we used the wage-to-revenue ratio – a KPI specialized for football business, which also characterizes the financial viability of a club (Dimitropoulos & Scafarto, 2021; Garcia-del-Barrio & Agnese, 2023). At the same time, with the introduction of FSR, an important role in PFCs' BP is played by their ability to generate revenues. Thus, since broadcasting is the largest revenue source for professional sports leagues and teams (Fortunato, 2013; Özaydın, 2022), including EPL (Cox & Philippou, 2022; De & DCruz, 2023), for a comprehensive assessment of PFCs' BP, we used the intensity of stream of broadcast income – i.e., the criterion of BR/total games in a season.

Independent variables

The characteristics of CHC that can significantly affect PFCs' SP and BP are the average age of players (Gerrard & Lockett, 2018; Gyimesi & Kehl, 2023), PFCs' market value (Kalén et al., 2019; Metelski, 2021) as a natural logarithm, teams' transfer investments (Rohde & Breuer, 2016a) as a transfer income-to-transfer expenditures ratio, and the teams' success in tournaments other than the EPL as a game ratio (PFCs' total games in a season/38 games in EPL).

Control variables

To assess the financial viability of PFCs, we used the current ratio (Abbas, 2023), financial result (profit/loss) (Cox & Philippou, 2022), and return on intangible assets as a key asset of PFCs (Franceschi et al., 2024a). Intangibles are a value proxy of CHC, affecting both SP and financial performance (Mnzava, 2013; Di Simone & Zanardi, 2020) and requiring significant amounts of liquid current assets.

3.3. Research Design

To test H1, we used Equation 1:

$$Position_{it} = a_0 + a_1 ln(MV_{it}) + a_2 AvAge_{it} + a_3 TInTEx_{it} + a_4 GR_{it} + a_5 ROIA_{it} + \\ + a_6 CR_{it} + a_7 FinResit + \varepsilon_{it} \quad (1)$$

[4] Onefootball. (2024, April 11). *Explained: How will the Premier League's new squad cost rules work?* Retrieved from https://onefootball.com/fr/news/explained-how-will-the-premier-leagues-new-squad-cost-rules-work-39335132 on July 07, 2025.

where:

$Position_{it}$ is PFC's position in EPL,
$ln(MV_{it})$ is a natural logarithm of PFC's market value,
$AvAge_{it}$ is the average age of PFC's players,
$TInTEx_{it}$ is PFC's transfer income-to-PFC's transfer expenditures ratio,
GR_{it} is a game ratio as PFC's total games in a season/38 games in EPL,
$ROIA_{it}$ is the return on PFC's intangible assets,
CR_{it} is PFC's current ratio as a dummy (1 – if CR $\in$ [1;1.5], 0 – otherwise),
FinResit is PFC's financial result as a dummy (1 – profit, 0 – loss),
a_0, a_1, a_2, a_3,a_4, a_5, a_6, a_7 are parameters of Equation 1,
subscripts *i* and *t* denote the club *i* and year *t*,
ε_{it} is a stochastic remnant in Equation 1.

H2 was tested with Equation 2:

$$Wage_{it} = \beta_0 + \beta_1 ln(MV_{it}) + \beta_2 AvAge_{it} + \beta_3 TInTEx_{it} + \beta_4 GR_{it} + \beta_5 ROIA_{it} + \\ + \beta_6 CR_{it} + \beta_7 FinRes_{it} + u_{it} \quad (2)$$

where:

$Wage_{it}$ is PFC's wage-to-revenue ratio,
β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7 are parameters of Equation 2,
u_{it} is a stochastic remnant in Equation 2.

The rest of the variables and subscripts are defined as previously.
H3 was tested with Equation 3:

$$AvBrdcstRv_{it} = \gamma_0 + \gamma_1 ln\,(MV_{it}) + \gamma_2 AvAge_{it} + \gamma_3 TInTEx_{it} + \gamma_4 GR_{it} + \gamma_5 ROIA_{it} + \\ + \gamma_6 CR_{it} + \gamma_7 FinRes_{it} + w_{it} \quad (3)$$

where:

$AvBrdcstRv_{it}$ is PFC's BR per game (BR/Total games in a season),
γ_0, γ_1, γ_2, γ_3, γ_4, γ_5, γ_6, γ_7 are parameters of Equation 3,
w_{it} is a stochastic remnant in Equation 3.

The rest of the variables and subscripts are defined as outlined previously.

3.4. Method

We used the SUR model (Zellner, 1962) to increase the robustness and effectiveness of our findings about the impact of CHC on SP (Equation 1) and BP (Equation 2), including the intensity of the stream of BR (Equation 3) of PFC as a for-profit entity. By applying the SUR model, we expect "that the regression coefficient estimators so obtained are at least asymptotically more efficient than those obtained by an equation-by-equation application of least squares" (Zellner, 1962, p. 348). This design is used to study the interrelated na-

ture of economic (Monjed & Ibrahim, 2020) and social (Sharma et al., 2020) aspects of business relations, including the selection and motivation of human capital (Abernethy et al., 2015). Dimitropoulos and Scafarto (2021) note that the SUR method is more efficient than the separate estimation of the impact of UEFA financial fair play on the top Italian PFCs' player spending, sports results, and financial performance.

4. Results and Discussion

Table 1 presents a correlation matrix and descriptive statistics for all variables included in the regression Equations 1–3. Table 1 indicates a significant negative correlation between BR per game (*AvBrdcstRv*) and PFC's position in EPL (*Position*), and a wage-to-revenue ratio (*Wage*) (correlation coefficients are -0.33 and -0.17, respectively), thus suggesting a trade-off between the intensity of the stream of BR and both SP and BP of PFC as a for-profit entity. The simple correlation coefficients show that CHC measured by a natural logarithm of the PFC's market value (*ln(MV)*) has the highest degree of linear association with BR per game (0.74, $p < 0.01$). This is consistent with Carrieri et al. (2018), Scelles et al. (2020) and Scarfe et al. (2021) on the strength of business causality in professional football leagues, including the EPL, which is manifested as media interest in the games of PFCs with a large number of players highly valued in the labour market.

SP is sensitive to all CHC's characteristics, including the average age (*AvAge*) (0.35, $p<0.01$) and transfer income-to-transfer expenditures ratio (*TIn/TEx*) (-0.12, $p<0.05$). Moreover, the most significant influence on PFC's position in the EPL is exerted by the game ratio (*GR*) (-0.67, $p<0.01$) and a natural logarithm of the PFC's market value (-0.66, $p<0.01$). The reason for their inverse relationship with PFC's sporting success lies in the fact that a smaller numerical value has a higher position in the league table. The other dependent variables correlate with all variables characterizing CHC, except for the transfer income-to-transfer expenditures ratio. This indicates a secondary importance of the financial aspects of the club's transfer policy for its ability to generate revenues and is discordant with the results of Franceschi et al. (2024a).

The descriptive statistics (Table 1) indicate that EPL clubs spend an average of 60% of their revenue on wages. This may be a result of the EPL transfer policy, where clubs' transfer income covers the average of 66% of their transfer costs. Due to this, the average age of players (*AvAge*) does not exceed 28.7 years, providing EPL's clubs with CHC in the prime of their talent curve. As a result, the mean natural logarithm of the PFC's market value (*ln(MV)*) is 5.41, which is approximately equivalent to 302 million GBP disclosed on transfermarkt.uk. Meanwhile, the average return on intangibles (*ROIA*) as the efficiency of investments in CHC has a negative value (-7%) given the loss-making nature of EPL's clubs (*FinRes*) in 54% of observations.

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Table 1. Correlation matrix and descriptive statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Position	1.00									
(2) Wage	0.32***	1.00								
(3) AvBrdc-stRv	-0.33***	-0.17***	1.00							
(4) Ln(MV)	-0.66***	-0.15***	0.74***	1.00						
(5) AvAge	0.35***	0.31***	-0.18***	-0.45***	1.00					
(6) TInTEx	-0.12**	0.08	-0.06	0.02	-0.07	1.00				
(7) GR	-0.67***	-0.30***	0.18***	0.62***	-0.36***	-0.03	1.00			
(8) ROIA	-0.08	-0.43***	0.08	-0.05	-0.08	0.03	-0.02	1.00		
(9) CR	-0.30***	-0.39***	0.21***	0.25***	-0.19***	0.04	0.28***	0.26***	1.00	
(10) FinRes	-0.11*	-0.52***	0.07	-0.06	-0.04	0.00	0.04	0.48***	0.19***	1.00
Mean	10.48	0.60	2.07	5.41	25.45	0.66	1.26	-0.07	0.20	0.46
Std. Dev.	5.77	0.13	0.99	0.78	1.14	0.93	0.18	0.86	0.40	0.50
Min	1	0.25	0.28	3.83	22.2	0	1.05	-3.34	0	0
Max	20	1.12	5.02	7.09	28.7	7.29	1.82	10.82	1	1

Note. Significant codes: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Source: authors' own calculations in Stata.

Tough competition in the EPL, along with other national and European club competitions, leads to the situation that the best clubs in terms of SP indicators play 82% more matches than provided for in the league regulations. This exceeds the average value for the EPL more than three times, where the teams played only 26% more matches than the standard of 38 games during the period under the study. As a result, the maximum value of PFC's BR per game (*AvBrdcstRv*) (5.02 million GBP) is almost 2.5 times higher than the average for the EPL (2.07 million GBP). At the same time, despite generating such revenues, EPL clubs had no liquidity problems (*CR*) in 20% of observations only.

Table 2 contains the full sample SUR estimation results. The lack of statistical significance of certain independent variables in specific equations of the SUR model suggests that these aspects of CHC may not have a measurable impact on the corresponding type of a football club's performance, as captured by the respective dependent variable.

Table 2. SUR regression results

Variables	Equation 1 (Dep. variable: *Position*)		Equation 2 (Dep. variable: *Wage*)		Equation 3 (Dep. variable: *AvBrdcstRv*)	
	Coef.	z-stat	Coef.	z-stat	Coef.	z-stat
Ln(MV)	-3.006931***	-8.20	0.0191961**	2.09	1.416442***	27.94
AvAge	-0.0352273	-0.17	0.0255272***	4.89	0.1474725***	5.11
TInTEx	-0.7465554***	-3.30	0.0144163**	2.54	-0.0994361***	-3.18
GR	-13.54542***	-8.70	-0.1594265***	-4.09	-2.598327***	-12.06
ROIA	-0.2835269	-1.00	-0.0268391***	-3.78	0.0728495*	1.86
CR	-0.747767	-1.30	-0.0649836***	-4.51	0.1132583	1.43
FinRes	-1.053135**	-2.18	-0.0954472***	-7.89	0.2483401***	3.72
Stochastic remnant (ε_{it} / u_{it} / w_{it}) in Equations 1-3 respectively	45.7877***	7.17	0.0915525	0.57	-6.138935***	-6.95
R-sq	0.5841		0.4754		0.7333	
Chi^2 (*p*-value)	445.29*** (0.000)		287.23*** (0.000)		871.47*** (0.000)	

Note. Significant codes: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.
Source: authors' own calculations in Stata.

The coefficients on all independent and control variables of Equation 1 are negative, which means their positive impact on SP (*Position*), since a higher place in the tournament table/ standings is taken by a smaller numerical value. At the same time, the coefficients on *GR* and *ln(MV)* are the highest for all three equations, which indicates a key role of such characteristics of CHC as a PFC's market value and the number of games played per season in achieving sporting success in the national league. However, the coefficient on an average age (*AvAge*) is statistically insignificant, which indicates the absence of a connection between the

age parameters of the team and the place taken by the club in the EPL. In addition, financial viability indicators carry statistically insignificant coefficients (except for the financial result, $p<0.05$), suggesting no impact of return on intangibles (*ROIA*) and liquidity (*CR*) on SP of EPL clubs. The estimates for Equation 1 support our expectation that CHC, in general, is significantly and positively related to PFCs' SP. This lends support to H1 and suggests that sports achievements are the result of the progress of individual players' performing skills and collective efforts of the team as CHC of PFC, which is consistent with the findings of Di Simone and Zanardi (2020), and Di Domizio et al. (2024).

In terms of Equation 2, the coefficients on three independent variables (*ln(MV)*, *AvAge*, and *TIn/Tex*) indicate a positive and significant impact on the wage-to-revenue ratio (*Wage*), while the game ratio (*GR*) and all control variables carry a negative and significant impact on the dependent variable. Since the higher wage-to-revenue ratios indicate that the workforce costs more than they contribute to the business, these findings suggest that CHC has a predominantly negative impact on the efficiency of BP. Instead, ensuring financial viability of PFC as a business entity contributes to getting the optimal return on investment for CHC's expenses. Thus, our data fail to support H2.

The results sourced from Equation 3 indicate that all independent variables have a significant impact on PFC's BR per game (*AvBrdcstRv*). However, a natural logarithm of the PFC's market value (*ln(MV)*) and average age (*AvAge*) has positive coefficients, while the transfer income-to-transfer expenditures ratio (*TIn/TEx*) and the game ratio (*GR*) have negative coefficients. Thus, the influence of CHC on the intensity of a stream of EPL club's BR is multidirectional. On the one hand, a high PFS's market value as a feature of the performing skills and potential of players stimulates the interest of viewers and media in the matches of such teams. However, each club is guaranteed a minimum of games that will be broadcast with its participation, as well as 'parachute' payments to the teams that are relegated from the EPL. Therefore, the mechanism of the distribution of the EPL's broadcast income creates an artificial limit for increasing the amount of BR per game by the most successful PFCs. Because of this, the maximum value of PFC's BR per game (*AvBrdcstRv*) exceeds the average indicator in the EPL by less than 2.5 times, while the maximum value of game ratio (*GR*) exceeds the average indicator in the EPL by more than 3 times (Table 1). That is why we assume that the reason for such multidirectional influence of CHC on the intensity of stream of EPL clubs' BR is the peculiarities of its distribution in the EPL, while the formation of PFCs' BR under competitive conditions would be free from such constraints (Bishop et al., 2022), and the impact of CHC on the intensity of stream of BR of PFC as a for-profit entity would be more pronounced. In view of this, we partially accept H3.

It is likely that the restrictions on the formation of EPL clubs' BR have negatively affected the revenue of those PFCs whose SP is of the greatest interest to viewers and the media. The teams having on contract many players with high salaries have a wage-to-revenue ratio (*Wage*) which is considered excessively high for running an efficient business. Despite the UEFA restrictions on clubs' wage expenses, the competition of PFCs for the best representatives of CHC as a driver of their sporting success occurs at the expense of wage. Therefore, the efficiency of BP of PFC as the for-profit entity is under the destructive

influence of both high wages for CHC and uncompetitive conditions for the formation of EPL clubs' BR as the main source of their revenues.

Thus, our results align with the findings of Gerrard and Lockett (2018) regarding the positive impact of "the team member dimensions of team-specific human capital" on the SP of PFCs. They are also supported by the arguments of Di Simone and Zanardi (2020), and Di Domizio et al. (2024), who emphasize the role of team performance in determining a club's success in national and international competitions. At the same time, the negative impact of CHC on the BP of PFCs observed in our study is indirectly at odds with the findings of Galariotis et al. (2018), who reported a positive relationship between BP and SP. However, Dimitropoulos and Scafarto (2021) note that the relationship between wages and sporting results can be negatively influenced by FSR.

It is important to note that success in football is primarily assessed through sporting achievements, which means that clubs tend to generate value in terms of winning (Galariotis et al., 2018). In this context, our conclusion about the importance of CHC for BR – as the main source of income for PFCs – corresponds with the views of Cox and Philippou (2022) and Özaydın (2022).

5. Conclusions

Our study is based on the assumptions that CHC has a positive impact on the SP and BP of PFC as a for-profit entity. Despite the statistical significance of the results obtained, not all of the hypotheses put forward have been confirmed. The empirical results show that CHC has:

1) a positive impact on PFC's SP in the domestic league (EPL);
2) a negative impact on the efficiency of PFC's BP determined by the wage-to-revenue ratio;
3) a generally positive impact on the intensity of stream of PFC's BR as the main source of its income.

These findings indicate that, under the circumstances where CHC's wages are formed in the conditions of pure price competition, the restriction of PFCs revenue due to the order of distribution of the broadcast income in the EPL reduces their BP. It is reflected to the greatest extent on business efficiency of the teams with a large number of highly paid players in the squad since the wage-to-revenue ratio is concurrently an object of the UEFA cost control rule.

PFCs' managers can use the empirical findings of this study on the following aspects:

1) the financial effect of the interest of spectators/viewers and the media in the teams with CHC, which is highly valued by the labour market, is limited;
2) the financial aspects of the club's transfer policy are of secondary importance to its ability to generate income;
3) CHC expenses are the cause of PFCs' problems not only with business efficiency, but also with profitability and liquidity.

Relatedly, PFCs should focus on balancing between sports results and BP by optimizing CHC expenses in the process of implementing their personnel policy, including transfers and wages, regarding which the UEFA regulations are tightening. Also, given the UEFA requirements for settling overdue payables, the management should increase liquidity of PFCs as business entities.

There are a few limitations of our research that should be addressed. The ability to generalize our results limits that it covers only EPL as a top league of one European country. Nor did we aim to determine the impact of FSR (2022) in terms of the sample period (2008–2023) and/or differences in the relevant EPL rules. The limitations of our study also include the omission of certain components of a football club's success – such as coaching effectiveness and team cohesion – from the indicators used to characterize CHC.

Future research should also account for the impact of CHC parameters on PFCs' sports, business and financial performance as a virtuous cycle of performance (Lago et al., 2004) for the successful transformation of the European football market into a profit-maximization league (Ruberti, 2024) and compliance with FSR (2022). It would be also interesting to see if the results obtained hold in other European football leagues.

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Hanna Mysaka – conceptualization, formal analysis, investigation, methodology, supervision, validation, writing – original draft preparation, writing – reviewing and editing.

Ivan Derun – conceptualization, data curation, formal analysis, methodology, software, investigation, visualization, writing – original draft preparation.

Mykola Holovanenko – data curation, formal analysis, supervision, validation.

Disclosure Declaration

The authors do not have any competing financial, professional, or personal interests in relation to any other parties within the scope of this research.

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