

Analysis of the market value of Premier League attacker

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Abstract. The main purpose of this study is to use the method of multiple linear regression to conduct a comprehensive discussion on “Factors affecting the market price of Premier League striker players”. In the era of increasingly hot soccer, the transfer of stars is a big attraction in the transfer period every year, but there are still many clubs signing overpaid and underpaid players. The overall objective of this study is to find the determinants of players’ price, so as to provide a reference for clubs to improve the utilization of funds in the transfer period. In this study, a dataset of player data for the 17-18 Premier League season was first downloaded via Kaggle. Then, the dataset obtained from Kaggle was used for empirical analysis to identify correlations that significantly affect the market price of players, and multiple linear regression analysis was performed after processing these data. Through the calculations, it was determined that match performance and goals scored had a significant positive impact on market value, and age and match possession had a non-significant negative impact on market value, which suggests that there is a need for the relevant team managers to optimize these aspects in order to promote a virtuous cycle of club development and team performance.

Keywords: Football, English premier league, market value.

1. Introduction

In recent years, with the growing interest in soccer, soccer has become not just a sport but a multi-billion dollar industry that attracts fans, sponsors and investors from all over the world [1]. In this industry, the English Premier League (EPL) is one of the most popular and competitive leagues with significant transfer fees and salaries for top players [2]. In particular, the value of strikers in the EPL has been a topic of great interest, with a variety of factors influencing their market value [3].

The literature suggests that there are a number of independent variables that can have an impact on player value. There are also various models used to assess the performance rights of soccer players. Some of the more important ones are age, performance points (goals and assists weighted), playing time, starts, red and yellow cards, etc. [4] In addition, due to the high number of injuries and illnesses that can be caused in soccer, physical factors, especially the presence or absence of disease, are also one of the possible considerations for player value [5].

In addition, the issue of financial inputs in the field of sports plays an important role in the economic sphere. There are two reasons for this situation, namely external and internal reasons. External reasons refer to different companies realizing their respective soccer investment goals. For example, non-profit relationships with sports clubs are utilized to build strong international sports brands, such as Manchester City and Real Madrid [6]. On the other hand, there are also internal reasons that are closely related to sporting activities, such as loyalty to the club and an emotional connection to the sport.

However, both reasons are directly related to the sporting performance of the sponsoring discipline and the wider context of any sporting event, hence the focus of this study is on soccer performance as a source of strong emotional responses from sporting event participants (e.g., sport administrators, sponsors, and spectators) [7].

The aim of this paper is to analyze the factors affecting the value of strikers in the Premier League and to develop a linear regression model to value footballers playing in the striker position, taking into account econometric modeling assumptions. By examining a range of variables such as performance indicators, age and nationality, the study seeks to provide a comprehensive understanding of the drivers of transfer fees and salaries for these players [8]. Understanding these factors is crucial not only for clubs and agents involved in player transfers, but also for fans and analysts wishing to assess the market value of players and enables clubs and stakeholders to make more informed decisions in the transfer market to increase the value of their investment and ultimately the spectacle of the game [9, 10].

2. Methodology

2.1. Data source

The data used in this study was taken from the Kaggle website and has a cut-off date of the end of October 2018. The dataset contains all available information on the variables of in-game performance, market value and nationality for all forward players in the Premier League. A linear econometric mathematical model was used to price the hypothetical market value of soccer players. In the econometric modeling of soccer players' performance rights, this work attempts to eliminate all formal estimation problems such as normality of residuals, linear relationships and heteroskedasticity. The result is a new linear regression model that prices the market value of the most valuable forward players using selected variables and appropriate estimation methods.

2.2. Indicator selection

The analysis carefully selects specific indicators to deepen the understanding of the factors that influence player value. These metrics include factors such as age, nationality, on-field performance, utilization rate, and club. The analysis ensures that these metrics will be an effective tool for analyzing the complex dynamics of forwards' market value (Table 1).

Table 1. Descriptive analysis

Indicator	Mean $\pm$ standard deviation	Variance	Median	Standard error
Age	25.857 $\pm$ 3.681	13.548	26	0.297
Page_views	1122.760 $\pm$ 1190.539	1417382	671.5	95.936
Fpl_value	6.458 $\pm$ 1.715	2.941	6	0.138
Fpl_sel	0.037 $\pm$ 0.067	0.005	0.011	0.005
Fpl_points	66.675 $\pm$ 63.980	4093.502	52	5.156

By utilizing these datasets, this paper seeks to delve into the complexities of player value. While acknowledging the comprehensiveness of these datasets, the author must also recognize their limitations, particularly in terms of on-field performance as well. These considerations are critical to maintaining the integrity and validity of the analysis. Furthermore, the careful selection of indicators forms the cornerstone of revealing the multifaceted influences on the value of Premier League strikers. Through this integrated approach, the author aims to provide a valuable contribution to the existing knowledge base in this area by elucidating the complex interplay between the various factors that influence player value.

2.3. Method introduction

The study began with data screening to select potentially relevant variables, and data were analyzed using multiple linear regression. The study selected age, number of times the players' wiki interface was

accessed, points scored in the match, possession and overall value of the match as independent variables. Descriptive and frequency analyses were conducted on these variables to highlight their characteristics and to facilitate the eventual multiple linear regression analysis of player value.

3. Results and discussion

3.1. Correlation analysis

Multiple linear regression analyses were conducted using age, number of visits to the player wiki interface, match score, possession and total match value as independent variables and market value as the dependent variable. The following table shows the Pearson visualization chart between five independent variables and dependent variable (market value) (Figure 1).

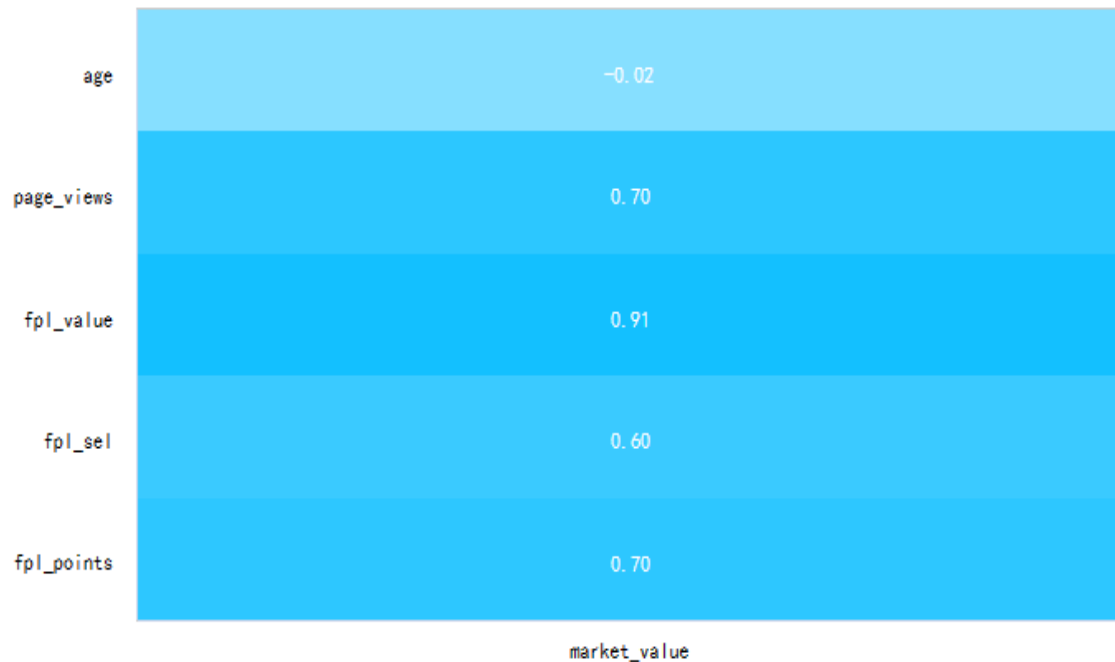


Figure 1. Pearson visualization chart of variables

From Figure 1, all the independent variables except age have a high positive correlation with the dependent variable (MARKET VALUE). While the correlation coefficient between age and market is only -0.024, indicating that there is no significant linear correlation between their two variables. Using the correlation plot as a basis, this experiment continued with a linear regression analysis of those five variables. The table shows that 154 samples participated in the analysis without any missing data (Table 2).

3.2. Model results

From Table 2, it can be seen that AGE, PAGE_VIEWS, FPL_VALUE, FPL_SEL, and FPL_POINTS are the independent variables, and MARKET VALUE is the dependent variable in the multiple linear regression. It can be seen that the model is formulated as:

$$\text{market value} = -28.824 - 0.232 * \text{age} + \dots + 0.024 * \text{fpl points} \quad (1)$$

The above equation shows that as age and fpl_sel increase, the market value of a player decreases. When page_review, fpl_value and fpl_points increase, the player's market value also increases. In addition, changes in fpl_value and fpl_sel significantly affect market value due to differences in the coefficients.

Table 2. Summary of the results of the multiple linear regression analysis

	Non-standardized coefficient		Standardized coefficient	t	p	Covariance diagnosis	
	B	Standard Error	Beta			VIF	Tolerance
age	-0.232	0.145	-0.056	-1.603	0.111	1.077	0.929
Page_views	0.001	0.001	0.047	0.902	0.369	2.396	0.417
fpl_value	7.341	0.584	0.827	12.562	0.00**	3.809	0.263
fpl_sel	-9.102	10.402	-0.04	-0.875	0.383	1.869	0.535
fpl_points	0.024	0.012	0.101	1.981	0.049*	2.29	0.437

3.3. Discussion

The combined analysis shows that age and possession significantly reduce the market value of a player. However, fpl_value and fpl_points increase a player's market value. In addition, the number of hits on a player's wiki page does not affect market value. In fact, a player's off-season game performance also tends to be negatively correlated with age during the game season. And, managers often judge whether a player deserves a higher salary based on the player's in-game performance, such as fpl_value, fpl_sel. Overall, the linear regression model developed in this experiment can more clearly help clubs intuitively determine the appropriate salary.

In addition to the quantitative variables analyzed above, experts also believe that the market value of a striker is affected by a variety of other factors, including nationality, performance of the club in which he is playing, whether he is a foreign player, and whether he is in a BIG6 club.

4. Conclusion

In this study, a multiple linear regression model was used, with player market value as the dependent variable, and age, overall on-field performance, on-field goals, on-field possession, and daily hits on players' wiki pages as the independent variables. Meanwhile, this paper also considers some control variables, such as player position and league level, to ensure the accuracy of the research results. This paper delves into the relationship between many influencing factors of the price of Premier League striker players. By analyzing a large amount of player data, this paper produces a series of statistical results and calculates the degree of influence of all independent variables on the market value of players. When other potential variables are taken into account, age, overall match performance, number of goals scored in a match and match possession are found to have a significant impact on a player's market price. Based on the regression model of the study, some suggestions can be made for scouts and managers to operate in future transfer periods. When choosing transfer targets as well as determining prices, businessmen should carefully consider these four factors to improve the effective utilization of funds and thus improve the team's performance.

Meanwhile, analyzing factors influencing football market value is crucial for understanding the economics of the sport. Future research in this area should consider several key elements: injury history and fitness, contractual factors, club performance and financial health, economic indicators. A player's injury history and current fitness levels significantly impact their market value. Longitudinal studies tracking injury patterns and recovery times can help predict future performance and market fluctuations. Besides, the length and terms of a player's contract, including buyout clauses and salary, play a significant role in market value. Analysis of contract trends across different leagues can provide a comparative understanding of how these factors influence valuations. Furthermore, the financial stability of a player's club and its performance in domestic and international competitions can affect market values. Clubs with higher revenues and successful track records are likely to influence higher market valuations for their players. Apart from those indicators, broader economic factors, such as inflation rates, currency exchange rates, and global economic health, can also impact football market

values. Studies examining the correlation between these economic indicators and football market trends would provide valuable insights. By integrating these factors, future research can develop more comprehensive models to predict football market values, aiding clubs, agents, and investors in making informed decisions. Advanced statistical techniques and machine learning algorithms could be employed to handle the complexity and interdependence of these factors, providing a robust framework for market analysis.

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