

A prediction model for valuing players in the Premier Football League of Iran

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Abstract

The aim of this study was to determine the prediction model for valuing players as human capital in the Premier Football League of Iran, Persian Gulf League. A descriptive-correlational approach was adopted. The population for the study consisted of all Iranian players in the Premier Football League of Iran, in the 2015-2016 season, a total of 418 players. The sample size for the study, on the basis of limited sampling (Cochran) and at the error level of 5 percent was 200. R software versions, 2-1-3 and EVIEWS software version 9 were used to calculate and process the variables. Descriptive statistics and multiple regression were used for the analysis of the player characteristics. Fifteen variables derived from the literature were included in the initial analysis. Based on the coefficients of the regression models, the findings show that five of these: the level of players' previous team; the number of goals scored in the previous season; the number of matches in which the player played in that season; age; and the number of representative international matches contributed significantly to the valuation model.

Keywords: Prediction model, valuation, football players, Iran, Persian Gulf League

Introduction

In a competitive world, human resources are one of the factors that can create competitive advantage for organizations. The success or failure of any organization depends largely on the people in that organization. In this regard, it should be noted that the distinction between human resources and other organizational resources lies in the fact that the human resources of an organization have capabilities such as learning, flexibility, innovation and creativity, which if properly managed, can ensure the long-term survival of organizations (Daghbandan, Noushazar, Eftekhari, & Taskhiri, 2014). Also, given that today's organizations are run in a competitive economic environment, accessing the right information in order to make timely, effective and efficient decisions, requires management to be guided by the intellectual capacity of the organisation's human capital. Yet, as the most expensive organizational resource, human capital is often overlooked in evaluating a company's assets (Ojokuku & Oladejo, 2015). According to the International Accounting Standards Board (IAS 38), an asset is "a resource controlled by the commercial entity as a result of past events, which is expected to make future economic benefits." Three main features of an asset include the ability to identify, control and gain future economic benefits (de Sousa Martins, 2015).

Progress in human knowledge and developments in the **phenomena of social life** have given rise to the emergence of new needs. This is the case for football. **Matteson (2003)** has shown that football is undoubtedly the most popular sport in the world, being the national sport of Latin America, Africa and many European countries, with participation rapidly spreading in other countries. Football has changed **dramatically** in recent years, so that clubs pay considerable prices on transfer and registration of players (Deloitte, 2013). News about the transfer of players is quickly noted by the media and the price of transfers has increased enormously in recent years. The highest "transfer cost" in 2013 has doubled compared to 2008 and **nine of the ten most expensive transfers of players** has happened in the last five years (He, 2015).

Now football can be considered as a specific industry, and its results should be examined from both financial and sport perspectives (Kuypers & Szymanski, 1999). Over the years, the financial structure of football clubs has undergone **many changes**. The main sources of funds started from ticket sales, then subsidies and, **more recently** has moved to investments by companies owned by the private sector. **Promotion and sponsorship agreements** have also evolved along with television **broadcasting rights** (Andreff, 2006). According to Forbes magazine in 2015, the present value of the top clubs in the world is estimated at billions of dollars. At the top of this wealth stand five leagues in Europe – the Premier League (England), La Liga (Spain), Serie A (Italy), Bundesliga (Germany) and Ligue 1 (France) (Forbes, 2015). A Deloitte report showed that twenty of the top clubs belong to these world five **most valuable leagues** (Deloitte, 2015).

Football clubs as organizations are in direct contact with **their human resources** - basically their players. Valuation of these resources seems to be **very necessary**, and data on valuation should be given to investors, directors, managers and others through the organisation's financial statements (Pandurangarao, Basha, & Rajasekhar, 2013). Football players are considered as assets of the clubs, and the **value of assets** is obtained by adding the total value of each of the relevant **features**. So, if both individual characteristics and values can be detected, **asset value can be estimated**. In the case of football players, relevant features include **specific skills and abilities** measured by performance (de Sousa Martins, 2015). **Performance of the players** is very important for the success of a team. Its final result provides **benefit** for the team. The high-performing player is worthy of a higher **market value**, because he can bring more money to the team. Yet there is limited **scientific research** which has analysed the relationship between the market value and the **performance of players**. Sports articles state a few factors and provide limited reasons **from football specialists** (football players, coaches, sports journalists, etc.). A **summary of the most common factors** include the position in the team, if the player is **captain**, **age of the player**, the inherent performance, league factors, the image rights (e.g. **Beckham**), **symbolic status** (e.g. Ronaldo) (He, 2015).

Literature review

In the financial literature, valuation is defined as the process of **estimating the value** of items. These items are usually financial assets or liabilities **such as stocks, bonds**, and intangible assets (including intellectual property), which **need to be evaluated** for various reasons, including the transfer of ownership, IPO, **mergers and acquisitions**, valuation of wealth, creation of value and so on. In the **valuation of an organization**, several methods can be used mainly derived from **primary approaches** for the valuation of corporations and assets. These including the **asset-based approach**, the

market-based approach, the income-based approach and the approach based on pricing option (Raee & Saeedi, 2014). Principled and correct valuation of assets allows for the optimal allocation of capital resources. Optimal allocation of capital in the economy plays a major role in the development of the organization. Improper valuation and the application of inappropriate and impractical methods for determining the value of assets causes non-optimal allocation of capital and the wasting of capital resources (Darabi & Alimardani, 2012). The next section presents research related to the valuation process. Based on valuation models, the variables for this study have been selected according to a theoretical framework and previous research conducted in this field.

Amir and Livne (2005) examined the efficacy of Financial Reporting Standard 10 (FASB, 2001) with regard to investment in football contracts. They found that there was only a weak relationship between these investments and three measures of future benefits and the duration of this association was at most two years. Forker (2005) in another study of the valuation and contract terms of football players, proposed procedures for reviewing FRS 10 and other international standards to better identify the price of contracts of players as assets in the company. He was able to show a positive correlation between financial accounting and contract income for the current year and the year before investment. The research of Tunaru, Clark, & Viney (2005) concluded that the value of a player varies from one club to another, depending on a number of performance measures, including previous membership in a foreign club, the effects of injuries and the level of the player's previous club. Parker, Burns, & Natarajan (2008) argued that previous performance, experience, and personal characteristics are involved in the valuation and evaluation of players. In an article entitled "Human capital: assessing the financial value of football players on the basis of real options theory", Kanyinda, Bouteiller, & Karyotis (2012) examined the performance value of soccer players derived from methods in the financial markets, using models presented by Black and Scholes (1973), Merton (1973), and Myers (1977), which are based on real option theory. Their results suggested that although the accounting value of football players obtained using these models may be more or less than the true value of player contracts, these models can nonetheless be applied to value players on the club's balance sheet.

Abraham, Harris, & Auerbach (2013) in their research examined the assumption that in professional sports the income of the team can be evaluated based on the individual performances of the players. In this case, the expected value of each player should be carefully evaluated in order to obtain a realistic estimate of the income of the team. Pujol & Garcia-del-Barrio (2008) in another study, used information on the athletic performance of players in order to measure their economic value. Their results showed that a 1% increase in their social value caused 0.5% increase in the price of a player's transfer contract. High social value is associated with the top price players. This impact is because top teams compete seriously to win a small number of top players. Other factors that are involved include player's age and nationality. The results also showed that financially powerful clubs have a greater ability to produce greater economic returns from the (social) media value of players. In his thesis, de Sousa Martins (2015) proposed two sets of variables, namely those related to the player (individual characteristics, performance, position, and other information related to the player), and those related to the club (history and prestige, performance and other characteristics). The results showed that the individual characteristics and performance of players did not justify their full transfer cost. However, entering a small number of variables related to the club, failed to increase the explanatory level

of the model significantly. Similarly Poli, Ravenel, & Besson (2015) in reporting monthly observations of footballers as "transfer value and possibilities" presented key indicators in estimating the value of the transfer of players in the form of two dimensions – the 'player dimension' (age, position, contract, international situation, experience, and performance) and the 'club dimension' (success, results, and level of competition). Finally, in a study, focusing on the English Premier League, Tamaru & Viney (2010) showed that the value of a player is a product of various factors, some of which are obvious (e.g. performance on the pitch, injury, and disciplinary cases) but others are less obvious (such as image rights or personal background).

Looking across briefly to examples in cricket, Rastogi & Deodhar (2009) in their study of the Indian Premier League showed that age, nationality, symbolic status and fame apart from being a cricket player seemed to be all important features in the valuation of cricketers. Depken & Rajasekhar (2010) in a study entitled "Market performance of cricket players" looking at the same league, concluded that the final value of a cricketer was determined by the characteristics of the player, and did not change during the first three years of the league. They also found little evidence of systematic discrimination against wages for players who were Indian nationals nor systematic differences in the average salary paid in the league.

Despite numerous searches of library and information resources, considering the interdisciplinary nature of the topic, only three studies were found to have been conducted on this topic in Iran. Shamsabadi (2010) in a thesis entitled "Valuation of professional football players based on their performance using the capital asset pricing model (CAPM)", provided a model for the valuation of professional football players based on their performance. Using players' win percentage and club income and applying the Capital Asset Pricing Model, he calculated the value of Iranian Premier Soccer League players. Izadyar, Memari, & Mousavi (2016) in their research showed that except for physical fitness, that was inversely associated with price, other indicators such as tactics, techniques, social acceptability, and Club's brand had direct and significant correlation with the pricing of players in the Iranian Premier Soccer League. Abdi, Zangi Abadi, & Talebpour (2016) indicated that variables such as age, number of national matches, number of goals, the level of a player's previous team, and the number of times he had been playing as a permanent player in the previous season were effective in pricing players as human capital of clubs. Other factors such as playing position, individual and team rewards and honours, dominant foot, height, goal ratio, and minutes of playing did not have a significant effect on the pricing of the players.

With regard to the increasing growth of football in modern societies, the significant profitability of the industry, and the competitiveness of the player transfer market, the problem of determining the economic value of a player and identifying the factors affecting the price of the player is one of the most important issues facing football clubs. With the transfer cost of players reaching such high levels and many clubs being in a critical financial situation, the value of their human assets can be very important, especially for shareholders and creditors. Consequently how to calculate the real value of a football player becomes a key question? (Kanyinda et al., 2012). Yet, given the role of football players as financial assets of their industry, few scientific studies have been conducted that have provided guidance on the valuation of football players and the identification of important factors affecting the pricing of football players for sports clubs.

As football decision-making is both quantitative and qualitative in nature and subjectivity in the valuation process is a major problem in all proposals and

negotiations on salary and the transfer cost of players, this study intends to present a model for the valuation of players in the Iranian Premier Football League using data-driven modeling techniques which combine methods developed in human resources.

Methodology

The research methodology is applied in terms of purpose and descriptive-correlational in terms of method. The population consisted of all Iranian players working in Premier Football League of Iran in 2015-2016 season - a total of 418 players. The sample size for the study, on the basis of limited sampling (Cochran) and at the error level of 5 percent is calculated as follows:

$$n = \frac{N \times Z\alpha^2 / 2 \times P(1-P)}{\epsilon^2(N-1) + Z\alpha^2 / 2 \times P(1-P)} = \frac{418 \times 1.96^2 \times 0.5 \times 0.5}{0.05^2 \times (418-1) + 1.96^2 \times 0.5 \times 0.5} = 200$$

After visiting the website of the Iranian Football League organization and accessing the list of all football teams in the Premier League, the share of players from each team was determined according to the required sample size. Players of each team were numbered, and then the required number was chosen randomly. The sample breakdown by club is presented in Table 1. After the selection process, the data for each player were collected.

Table 1

Contribution to sample from each Premier League team

Share of the team from the total sample	Number of players	Club name	Row
10	20	Persepolis Tehran	1
13	27	Esteghlal Tehran	2
13	27	Sepahan Esfahan	3
10	21	Teractorsazi Tabriz	4
12	25	Zobahan Esfahan	5
13	27	Naft Tehran	6
13	28	Saipa Karaj	7
12	25	Foulad Khouzestan	8
14	29	Malavan Bandar Anzali	9
12	24	Esteghlal Khouzestan	10
11	23	Saba Ghom	11
15	32	Rahahan Yazdan	12
13	27	Padideh Mashhad	13
12	26	Gostaresh Fould Tabriz	14
14	30	Siahjamegan Mashhad	15
13	27	Esteghlal Ahwaz	16
200	Required sample size	418	Total number of players

Information was obtained from library resources such as official magazines and newspapers, as well as reliable websites such as the official website of the Iranian Football League (<http://iranleague.ir>), the official website of the individual clubs in the Premier League, the official website of the Islamic Republic of Iran Football

Federation (<http://www.ffiri.ir>), Navad official website (<http://90tv.ir>), and transfer market website (<http://www.transfermarkt.com>).

To analyse the data, descriptive statistics (mean, median, standard deviation, and skewness), and the multiple regression method were used. To calculate and process variables, R software versions, 2-1-3 and EVIEWS software version 9 were used. To analyze the results, the following multiple regression model was used:

$$\text{Price} = \beta_1 \text{ Age} + \beta_2 \text{ Goalkeeper} + \beta_3 \text{ Defense} + \beta_4 \text{ Midfield} + \beta_5 \text{ Forward} + \beta_6 \text{ Goal} + \beta_7 \text{ National Games} + \beta_8 \text{ Individual Reward} + \beta_9 \text{ Foot} + \beta_{10} \text{ Height} + \beta_{11} \text{ Team level} + \beta_{12} \text{ Goal Ratio} + \beta_{13} \text{ Team Reward} + \beta_{14} \text{ Game number} + \beta_{15} \text{ Game minute}.$$

Table 2

How to measure the variables

<i>Measurement of the variable</i>	<i>Symbol</i>	<i>Variable</i>
The price of the player in the recent season	Price	Price
Age of the player	Age	Age
If the player is goalkeeper, the value is 1, otherwise, it is 0.	Goalkeeper	Goalkeeper
If the player is defense, the value is 1, otherwise, it is 0.	Defense	Defense
If the player is midfield, the value is 1, otherwise, it is 0.	Midfield	Midfield
If the player is forward, the value is 1, otherwise, it is 0.	Forward	Forward
Number of goals scored in the previous season	Goal	Goal
Total number of matches in which the player has played at national level	National Games	National Games
All rewards and honors the player has achieved	Individual Reward	Individual Reward
If the player mainly plays with his right foot, the value is 1, if he mainly plays with his left foot, the value is 2, and if he mainly plays with his both feet, the value is 3	Foot	Foot status
Height of the player	Height	Height
Based on the rank of the players' team in the previous season, if the team was ranked in the first one-third, the value is 3, if the team was ranked in the second one-third, the value is 2, and if the team was ranked in the last one-third, the value is 1.	Team level	Team level
Ratio of the goals scored in the previous season to game numbers	Goal Ratio	Goal Ratio
Total number of prizes and rewards a player achieved with his previous team	Team Reward	Team Reward
Total number of the games in which a player played in the last season	Game Number	Game Number
Total minutes a player played in the previous season	Game Minute	Game Minute

Sources: He (2015), He (2014), Chan (2009), and Parker et al., (2008)

** The four dummy variables that simultaneously measure the players position, create collinearity in the model and the model will not fit. This requires one of these variables to be excluded from the model, In this study we have eliminated the forward variable from the model.*

Results

The data were first examined descriptively using measures of central tendency such as the mean and median and dispersion indicators such as standard deviation, skewness, and kurtosis. If the mean and median values are close it means that the data are almost symmetric, which is true for the variables of Age, Game Number, Goalkeeper, Height, Price, Individual Reward. Using skewness as the index of data symmetry, the variables Age, Game Number, Game Minute, and Height were close to zero (skewness and kurtosis for data with a normal distribution is zero), indicating that the distribution of independent variables and the dependent variable is close to normal distribution.

Table 3

Research descriptive statistics

Kurtosis	Skewness	SD	Median	Mean	Variable
2.332567	0.296652	4.08497	27	27.16477	Age
1.916825	0.95751	0.452267	0	0.284091	Defense
1.378578	-0.59246	0.949573	3	2.284091	Foot
2.503909	1.22634	0.427466	0	0.238636	Forward
2.059142	-0.31466	714.5681	1528	1466.938	Game Minute
2.024248	-0.33355	8.089867	17	16.42614	Game Number
5.128459	1.682537	2.794609	1	1.960227	Goal
9.1	2.84605	0.2883	0	0.090909	Goalkeeper
9.580745	2.143961	0.17362	0.04	0.120227	Goal Ratio
3.036984	0.332839	6.170984	179	179.6818	Height
1.217865	0.46676	0.488305	0	0.386364	Midfield
12.50406	2.997084	16.54708	0	8.198864	National Games
3.162634	0.876757	2.69E+09	3.90E+09	4.26E+09	Price
47.32638	6.025472	0.423306	0	0.096591	Individual Reward
2.08535	-0.46253	1.022205	3	2.846591	Team level
6.708813	1.925903	1.464693	0	0.943182	Team Reward

In this section, the results of research models and pre-assumptions of the model are presented.

Testing the assumptions of the model. In Table 4, the results of three tests related to three classical assumptions of the research model are presented: the test of the normality of residuals (Lilliefors test); test of zero mean of residuals (Student's t-test), and; measures of the auto-correlation between the residuals (Durbin Watson test).

Table 4

Results of Lilliefors, t-student, and Durbin-Watson tests

Lilliefors (Kolmogorov-Smirnov) normality test	
p-value = 0.3466	D = 0.0501
One Sample t-test	
p-value = 1.00	t = 0
Durbin-Watson test	
p-value = 0.7623	DW = 1.7209

Considering the p value of the Lilliefors test of 0.3466 which is more than 0.05, the null hypothesis that the residuals are normal is accepted. Considering the p value for Student's t which is equal to 1 and more than 0.05, the null hypothesis stating that the residuals have a mean of zero is accepted. Thirdly considering the p value for the Durbin-Watson test that is equal to 0.7623 and is more than 0.05, the null hypothesis stating that there is no correlation between the residuals of the model is accepted.

Further, the heteroskedasticity test (ARCH test) in EVIEWS version 9 was used. The results are shown in table 5.

Table 5

Results of Heteroskedasticity test

Heteroskedasticity Test: ARCH		
Statistic	Value of statistic	p-value
F-statistic	0.001841	0.9658
Obs*R-squared	0.001863	0.9656

The p-value of the F statistic is equal to 0.9658 and is more than 0.05. Therefore, the null hypothesis that the variance of the residuals is the same is accepted.

Finally, in software R, one of the tests for this hypothesis is VIF (variance inflation factor) which was also used. The results of this test are presented in Table 6.

Table 6

Results of variance inflation factors test

Variance Inflation Factors test	
VIF statistic	Variables
1.203028	Individual Reward
1.332446	Team level
1.957291	Team Reward
1.465616	National Games
2.378177	Midfield
1.456960	Height
4.641909	Goal Ratio
2.535820	Goalkeeper
4.742426	Goal
5.696499	Game number
6.804315	Game Minute
1.322176	Foot
2.625553	Defense
1.413584	Age

The VIF of the variables is less than 10. It can therefore be concluded that the null hypothesis that there is no alignment between the independent variables is accepted.

Table 7

Results of initial regression model

p- value	statistic T	SD	Beta coefficient	Variables
0.7247	-0.352820	3.67E+08	-1.30E+08	Individual Reward
0.0000***	6.697326	1.60E+08	1.07E+09	Team level
0.6485	-0.456662	1.36E+08	-61973744	Team Reward
0.0000***	4.657525	10384695	48366980	National Games
0.6858	-0.405284	4.50E+08	-1.83E+08	Midfield
0.2867	1.068938	27798070	29714407	Height
0.1858	-1.328962	1.76E+09	-2.34E+09	Goal Ratio
0.6634	-0.435980	7.83E+08	-3.42E+08	Goalkeeper
0.0238**	2.282049	1.11E+08	2.53E+08	Goal
0.7088	0.374094	4.39E+08	1.64E+08	Game Minute
0.0343**	2.134981	46831980	99985381	Game number
0.7560	0.311227	1.73E+08	53787202	Foot
0.2990	-1.042079	5.12E+08	-5.34E+08	Defense
0.0210**	2.331593	41822137	97512212	Age
0.0689*	-1.831536	5.46E+09	-1.00E+10	Constant value of the model
NA	NA	NA	NA	Forward
* significant at 0.10 ** significant at 0.05 and *** significant at 0.001				
p-value	F-statistic	Adjusted R- squared	R-squared	Total results of the model
<0.0000	13.87557	0.510273	0.549904	

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0.0689*	-1.831536	5.46E+09	-1.00E+10	Constant value of the model
NA	NA	NA	NA	Forward
* significant at 0.10 ** significant at 0.05 and *** significant at 0.001				
p-value	F-statistic	Adjusted R- squared	R-squared	Total results of the model
<0.0000	13.87557	0.510273	0.549904	

The results of table 7 show that of the independent variables, the ~~age~~, number of national games, number of goals scored in the previous season, the ~~level~~ of the previous team of the player, and the total number of games in the ~~previous season~~ are significant, so that they can be used in valuation of the players.

Therefore, the final model of the valuation of players is presented in table 8 as follows:

Table 8

Results of final valuation model

p-value	T statistic	SD	Beta coefficient	Variables
0.0171**	2.408930	36692316	88389218	Age
0.0000***	6.471408	19278191	125000000	Game Number
0.0054***	2.817734	52488043	148000000	Goal
0.0000***	7.705595	1.37E+08	1060000000	Team Level
0.0000***	5.406854	8528462	46112144	National Game
0.0003***	-3.655269	1.06E+09	-3870000000	C
* significant at 0.10 ** significant at 0.05 and *** significant at 0.001				
Prob(F-statistic)	F-statistic	Adjusted R-squared	R-squared	Total results of the model
0.0000	40.98610	0.533247	0.546583	

Testing the assumptions of the revised model. The revised model was tested to ensure there were no violations of the assumptions involved. Following the application of the Lilliefors normality test ($D=0.0454$; $p=0.5029$) the null hypothesis of the test stating that the residuals are normal was accepted. On the basis of the student's t ($t=-1.1019$; $p=0.3094$) the null hypothesis stating that the residuals have a mean of zero was accepted. Finally, on the basis of the Durbin-Watson test ($DW=1.6404$; $p=0.4325$) the hypothesis that there is no correlation between the residuals of the model was accepted and using the heteroskedasticity test (ARCH test) in EVIEWS version 9, the null hypothesis stating that the variance of residuals is the same was accepted ($F=0.018701$; $p=0.8914$).

Therefore, the final model to determine the price of football players is as follows:

$$\text{Price} = -3870000000 + 88389218 * \text{Age} + 148000000 * \text{Goal} - 46112144 * \text{National Game} + 1060000000 * \text{Team Level} + 125000000 * \text{Game Number} - \epsilon$$

The variables included are the level of previous team of players, number of goals scored in the previous season, number of games in which the player played in the previous season, age, and number of National games of the player.

Conclusion and Recommendations

The main objective of this research was to explain the valuation of players in the Iranian Premier Football League, i.e. Persian Gulf League by means of a predictive

model. According to the descriptive data presented the average age of players was 27.1 years, the average minutes played was 1466 minutes, the average number of games played in the season was 16, and the average number of goals scored for each player was 1.96. The average age of 27.1 years for the Iranian Premier League in this study shows an insignificant difference with the average age of players from other leagues around the world. In 2016-2017 season, the Transfer Market website indicated the average age was 27.5 years for the Russian Premier League, 27.1 for the English Premier League, 26.7 for the Spanish La Liga, 26.5 for the Italian Serie A, 25.7 for the French Ligue 1, and 25.4 for the German Bundesliga. The website reported an average age of 25.5 for the Iranian Premier League, which somewhat differs from the figure obtained in this study. This may be attributed to sampling error but as the figure in this study is comparable with that for other leagues around the world, does not seem unreasonable. Average minutes of game as well as the number of games during the season indicate that on average, players have played about half of the games possible for their team and have scored an average of 1.96 goals. It should be noted that the latter number refers to all players including the goalkeepers, defence, and midfield players, and so it is not unexpected.

The Transfer Market website determined the total market value of all the world's leagues in 2016-2017 season. This showed the Persian Gulf League valued at 105.10 million euros. The South Korean K-League was valued 118.15 million euros, the Japanese J-1 League at 229.45 million euros, the Italian Serie A at 750.2 million euros the German Bundesliga at 2.54 billion euros, the Spanish La Liga at 3.53 billion euros, and the English Premier League at 4.83 billion euros.

As the statistics show, the values of the Asian leagues are close together but show considerable difference to the values of the European leagues. Important factors are involved in this regard. Development, promotion and worthiness of a league requires long-term and continuous planning and the cooperation of various sectors which can only be realized in the long run. The website has also valued the clubs in the Iranian Premier Football League. Persepolis Tehran is valued at 12.78 million euros, Esteghlal Tehran is valued at 12.58 million euros, and Teraktorsazi Tabriz is valued at 8.13 million euros. These figures show a lot of difference when compared to Real Madrid with a value of 769.30 million euros. The valuation of players in the Iranian Premier Football League highlighted by the website includes Omid Ebrahimi, the defensive midfielder of Esteghlal Tehran with a value of 1.50 million euros, and Mehdi Taremi, the striker of Persepolis with a value of 1.20 million euros as the most expensive players in the Iranian Premier Football League. It should be mentioned that Lionel Messi at a value of 120 million euros and Cristiano Ronaldo at 110 million euros are the most expensive players in the world at the time of going to press.

Based on the findings reported, it can be stated that of all the variables considered for this study, namely age, player position (goalkeeper, defender, midfielder, striker), the number of goals scored, the number of national games, individual awards and honours, dominant foot, height, level of the previous team, the ratio of goals scored to the games played, team awards and honors, the number of games played, and minutes played, had some impact on the price of players as human capital of the clubs. However based on the final research model and the impact of these factors on the price of players, the contributing variables to the player valuation model were: the level of the previous team of the player, the number of goals scored last season, the number of games played at last season, age, and number of national games, respectively.

The previous team of the player had the greatest impact on **valuation in the Iranian Premium Football League**. The player who has played in a **famous team with high rankings in the table** can receive more for his contracts for **the next season**, while a player who wants to move to a better team from a **lower-level team will receive a lower price**. De Sousa Martins (2015) considered club-related variables including the club's history and reputation as effective factors involved in valuing football players. Poli et al., (2015) considered club size as a key indicator in estimating the transfer value of players. Parker et al.,(2008) considered the previous performance of players, and Tunaru et al.,(2005) considered membership in a foreign club and the level of the player's previous team as the most important factors in the **valuation and transfer** of players. Such findings are consistent with the results of this **research**.

The number of goals scored in the previous season is another important factor in the valuation of football players according to our findings. When considering different positions in football, it is expected that strikers will score more goals than others. A player in other positions who can score goals has a competitive advantage over his counterparts and may have a higher market value than others. This finding is supported by He (2014) who used number of goals scored to predict a player's value and Tunaru & Viney (2010) who considered performance in the field, including the number of goals scored, as factors for valuation. Moreover, the CIES Football observatory web-site (2016) in their calculations consider goals scored as one of the inputs used to calculate the price/value of players

The number of games played last season shows the potential, ability, and importance of a player for his team, and indicates how effective a player is for the club. It seems that a player who played more games last season, has higher competence than other players. The CIES website also considers games played as another input used to calculate the value of players which shows the importance of this variable.

Another important factor in valuation is identified as **the age of the player**. The span of the professional playing age of footballers is **usually between 18-34**. The market value of the player varies considerably within that span. Younger players with less skills have a lower market value than when they reach a **peak in their skills and abilities**. When the players lose some of their **physical capabilities**, **this value reduces**. According to various sources, the average age when **players reach** their peak performance is between 24 and 27 (de Sousa Martins, 2015). **It seems that** the value of football players plotted against their age follows an **inverted U curve**. However due to the unique characteristics of each player, this curve can **vary at certain intervals**. In 2016, the Soccerex website (<https://www.soccerex.com>) published the value of the top 10 football players below the age of 21, in which Anthony Marshall, a French player at Manchester United with a value of 47 million euros was the **most expensive player**. Transfer Market website, in ranking the most valuable football players, valued Andres Iniesta, 32-year-old FC Barcelona player at 30 million euros. De Sousa Martins (2015) concluded that the age of players has a **negative impact** on their value, indicating that the potential of younger players is **more valuable than experience**. Pujol & Garcia-del-Barrio (2008), Rastogi & Deodhar (2009), Poli et al.,(2015), He (2014), and He (2015) in their studies likewise considered age as an important factor in valuation as well as the transfer of players. In addition, the CIES website also uses age as input in valuation of football players.

The last effective variable identified in the research model is **number of national games played**. The value of a player who plays in the **national team** is **higher** than a person who does not have this achievement. Playing in national games shows that the

player is one of the country's best players and has a high potential. Playing in the national team also brings the player popularity in society and football clubs, and this can supplement the playing abilities of national players and increase their market value. Garcia-del-Barrio & Pujol (2004) introduced popularity as an important factor in the transfer value of a player. De Sousa Martins (2015) concluded that both number of national games and the popularity of the player have a positive impact on the costs paid by the buyer club. Finally, Izadyar et al., (2016) showed social acceptability has a significant positive correlation with the pricing of players in the Iranian Premier Football League.

References

- Abdi, S., Zangi Abadi, M., & Talebpour, M. (2016). Determination of Role of Effective Factors in Valuation of Players in Iranian Premier Football League. *Journal of Human Resource Management in Sport*, 3(2), 121–136.
- Abraham, R., Harris, J., & Auerbach, J. (2013). Human Capital Valuation in Professional Sport. *International Journal of Business, Humanities and Technology*, 3(3), 12–21.
- Amir, E., & Livne, G. (2005). Accounting, valuation and duration of football player contracts. *Journal of Business Finance & Accounting*, 32(3-4), 549–586.
- Andreff, W., & Szymanski, S. (2006). *Team sports and finance*. UK: Edward Elgar Publishing.
- Chan, M. (2009). *9 Factors to Determine a Football Players Transfer Value – Comparison to US Sports*. Retrieved from <http://www.arsenalreview.co.uk/2009/07/9-factors-to-determine-football-transfer-value-fee-kaka-ronaldo-adebayor>
- CIES Football Observatory (2016). *Transfer values and probabilities: the CIES Football Observatory approach*. Retrieved from <http://www.football-observatory.com/IMG/sites/mr/mr16/en/>
- Daghbandan, A., Noushazar, M., Eftekhari, M., & Taskhiri, A. R. (2014). *New approaches to human resource accounting in the valuation and reporting of human capital*. Paper presented at the 3rd National Conference of Accounting, Financial Management and Investment, Gorgan, Golestan Iranian Scientific Society of Professional Managers and Accountants.
- Darabi, R., & Alimardani, K. (2012). Valuation of companies listed in Tehran Stock Exchange with the approach of using real cash flow and applying Arzak 2005 modeling. *Financial Accounting and Auditing Studies*, 4(16), 123–155.
- de Sousa Martins, D. (2015). *Hedonic Pricing in Professional Football: Is players# 8217; transfer value explained by sporting performance?* (Master in Management Dissertation).
- Deloitte (2013). *Annual review of football finance 2013*. Retrieved from <https://www2.deloitte.com>
- Deloitte (2015). *Football money league*. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/uk/Document_sports-business-group/deloitte-football-money-league-2015.PDF
- Depken, C. A., & Rajasekhar, R. (2010). Open market valuation of player performance in cricket: Evidence from the Indian Premier League. *Available at SSRN 1593196*, 1–21.
- Financial Accounting Standards Board (2001). Statement of Financial Accounting Standards No. 142: Goodwill and Other Intangible Assets (June, Norwalk, CT: FASB)
- Forbes (2015). *The Business of Soccer*. *Forbes Magazine*.
- Forker, J. (2005). Discussion of accounting, valuation and duration of football player contracts. *Journal of Business Finance & Accounting*, 32(3-4), 587–598.
- Garcia-del-Barrio, P., & Pujol, F. (2004). *Pay and performance in the Spanish soccer league: who gets the expected monopsony rents?* Retrieved from <http://dadun.unav.edu/bitstream/10171/7037/1/5.%20Pedro%20Garc%3%ada%20del%20Barrio,%20Frances%20Pujol.pdf>

- He, M. (2015). *Exploring the Relationship between Football Players' Performance and Their Market Value*. (Master's Thesis).
- He, Y. (2014). Predicting Market Value of Soccer Players Using Linear Modeling Techniques. *Berkely. edu*, 1–15.
- Izadyar, M., Memari, J., & Mousavi, M. H. (2016). Pricing equation for players of Iranian Soccer League. *Economic Research*, 51(1), 25–40.
- Jarast Shamsabadi, P. (2010). *Valuation of professional football players based on their performance, using the capital asset pricing model (CAPM)*. (MA), University of Esfahan.
- Kanyinda, A., Bouteiller, C., & Karyotis, C. (2012). Human capital: assessing the financial value of football players on the basis of real options theory. *Investment Management and Financial Innovations*, 9(4), 27–37.
- Kuypers, T., & Szymanski, S. (1999). *Winners and Losers, the Business Strategy of Football*. London: Viking.
- Matheson, V. A. (2003). *European football: a survey of the literature*. Williams College, Department of Economics.
- Ojokuku, R. M., & Oladejo, K. S. (2015). Human resource accounting and human capital valuation in Nigeria: Prospects and Challenges. *International Journal of Economics, Commerce and Management*, 3(7), 600–609.
- Pandurangaroo, D., Basha, D. S. C., & Rajasekhar, D. (2013). A Study On Human Resource Accounting Methods And Practices In India. *International Journal of Social Science & Interdisciplinary Research*, 2(4), 95–102.
- Parker, D., Burns, P., & Natarajan, H. (2008). Player valuations in the Indian Premier League. *Frontier Economics*, 116, 1–17.
- Poli, R., Ravenel, L., & Besson, R. (2015). *Transfer values and probabilities*. Retrieved from www.football-observatory.com/IMG/pdf/mr03_eng.pdf
- Pujol, F., & Garcia-del-Barrio, P. (2008). Economic valuation of football players through media value. 15–27.
- Raei, R., & Saeedi, A. (2014). *Principles of Financial Engineering and Risk Management*. Tehran: SAMT.
- Rannou, Y. (2012). A Pricing analytical framework to value soccer players. Available at SSRN 2086176.
- Rastogi, S. K., & Deodhar, S. Y. (2009). Player pricing and valuation of cricketing attributes: exploring the IPL Twenty20 vision. *Vikalpa*, 34(2), 15–23.
- Soccerex (2016). *Top ten below the age of twenty-one*. Retrieved from <https://www.soccerex.com/insight/performance>
- Souri, A. (2014). *(Preliminary) Econometrics Associated with the Use of Eviews 8 and Srata 12*: Farhangshenasi publishing.
- Tunaru, R., Clark, E., & Viney, H. (2005). An option pricing framework for valuation of football players. *Review of financial economics*, 14(3), 281–295.
- Tunaru, R., & Viney, H. P. (2010). Valuations of soccer players from statistical performance data. *Journal of Quantitative Analysis in Sports*, 6(2), 1559–0410.1238.