The Influence of Human Capital on Organization Value
Empirical Evidence from High Level NBA Athletes Changing Team

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Abstract. As an intangible asset, human capital is becoming more and more important in enterprises. However, its variability and effectiveness make it difficult to measure it properly. Players' transitions often take place in NBA teams, but coaches, game systems, and the physical environment like the stadium are rarely changed, which provides a unique experiment for evaluating the value of human capital. This problem has been studied in many fields, such as movie stars and CEO valuation. This paper compares the influence of star players' transition on the team value, and also controls the factors of the team itself, such as the total salary and the results of the game. The result of this paper is that top players' transition has a significant impact on the financial success of the team, which supports the superstar hypothesis.

Keywords: Intangible Asset · Human Capital Valuation · Enterprise Value · Stars Effect · Staff Turnover

1 Introduction

Many people recognize the importance of key individuals in a business or organization and the additional value they bring to the group, but quantifying that value is a major challenge. The main difficulty is that most businesses are team-based and have a constant flow of people and environmental change. This variability requires the use of econometric.

Becker [1] has studied human capital, and his research on human capital theory has led to more attention to this factor of production in organizations or firms. In the financial field, Bertrand and Schoar [2] measured the human capital of CEOs or CFOs by comparing the value of the firm before and after changing the CEO or CFO and found that CEO human capital significantly increased the value of the firm; however, in the entertainment industry, Hamlen Jr [3] examined the relationship between music revenues and star singers, Ravid [4] examined the relationship between star actors and movie revenues, and Elberse [5] measured the value brought by the star effect from the perspective of movies on stock price changes. They did not obtain consistent conclusions. The study by Filson and Havlicek [6], by analyzing the exit of famous actors and the change of movie royalty revenues, found that the exit of famous actors will lead to a

decline in movie royalties, and In the study of Han and Ravid [7] of human capital in Broadway theater, the value of the star effect and human capital is measured by the conversion of star performers, which is reflected in the ticket prices and attendance of the venues before and after the change of star performers.

Referring to the study of Han and Ravid [7] on Broadway, this paper assesses the value of human capital by using NBA (National Basketball Association) teams as the study subjects, thus providing an empirical analysis from big data for assessing the impact of specific talent on firm value. There are three reasons for choosing NBA teams as the study projects: first, as a business league, it has certain requirements for revenue and value growth, and is a profit-making organization like most enterprises; second, as a sports league, its success is highly dependent on core human capital, and its operation model is simpler and more transparent, and data is more easily available; in addition, because of its long establishment, various systems and systems are more mature than those of the domestic In addition, because of its long establishment, various systems and systems are more mature than CBA, so this paper decided to take NBA team as the research object.

The human capital of NBA teams is mainly reflected in three aspects, which are management, coaching team and players. Among these three aspects, the ultimate goal of team management and the latter two are different. The management of the team, such as general manager and president, is more concerned about how to maximize profits, and its work includes many trade-offs and games, which involves many indicators that are difficult to measure quantitatively; while the goal of the coaching team and players is clearer, that is, to make the team to get better results as much as possible with the ultimate goal of winning the championship, which is more transparent and easier to identify for the management. Among the coaching team and players, it is generally believed that in the short term, it is the skill level of the players that can influence whether the team can achieve better results or even win the championship in the end. Therefore, this paper will focus on the value that star players bring to the team.

This paper reflects the impact of human capital on team value through the change in team value caused by players moving in and out between teams. Within these transactions, the focus of this paper is on star player transactions, specifically those in which star players join other teams. Rosen [8] illustrates the role of the star effect, even though stars themselves may not have superior skills and talent; however, Adler [9] further verified that stars can still function as stars without superhuman talent; however, Mac-Donald [10] illustrated how stars with superhuman talent can function under specific circumstances. The addition of a star player makes the team perform better and thus attracts more attention, which means that the addition of a star player will bring some changes to the team, and this paper will focus on the changes in the market value of the team and try to determine the human capital value of the star player by doing so. In the market value report of NBA teams released by Forbes at the beginning of each year (January or February), the market value of a team is composed of four parts: sport, market, stadium and brand, except for the stadium, which is a fixed value, the other three parts are more or less affected by the performance of the team. Therefore, in terms of assets, the market value of the team is also more intuitively used to measure the impact of star player changes on the value of the team. Combining both the asset and revenue

components, this paper focuses on the impact of star player additions on attendance changes and market value changes, and explores the relationship between them.

2   Data Sources and Study Settings

The research object of this paper is all the teams with star roster changes between the 2010/2011 and 2018/2019 seasons, and the sample object of this paper is the entire NBA, including 30 teams. Record at least 550 players who made the All-star, All-NBA, All-Defensive and All-Rookie teams from the 2010/2011 to 2018/2019 seasons.

Based on the collected sample data, this paper conducts regression analysis and constructs the empirical model as follows

$$\text{Teamvalue} = \alpha + \beta * \text{Class} + \gamma * \text{Controls} + \varepsilon \tag{1}$$

The star player variable is the core explanatory variable. This paper divides star players into three categories. Players who have appeared on All-Star Weekend and All-Nba teams in three or more seasons are considered the most talented players (Class III stars), and players who have appeared in only one or two seasons are considered players with slightly additional talent (Class II stars). Players who appear only on all-Rookie teams and only on all-defensive teams are highly recognizable eligible players (Class I stars).

Teams' average home attendance changes and team market values were considered as dependent variables, with team market values derived from Forbes' NBA Team Valuations published in January-February each year. The paper also controls for team market values, total salaries, tournament results, and state GDP and population in variable years. GDP and population data come from official US statistics websites https://www.bea.gov and https://www.census.gov.

The variable definitions are listed in Table 1.

Table 1. Variable definition

variable name	Definition
Seat	Stadium attendance for the team's home games during the season
Value	Team market value
Salary	The total salary paid by a team for all players during the season
GDP	The gross annual product of the team's state
Pop	The current year population of the team's state
Playoff	Whether the team made the playoffs this season
Regular	Whether the team's winning percentage is higher this season than the previous season
Inclass1, 2, 3	Category 1 (or 2 or 3) star player joins the team
Outclass1, 2, 3	Category 1 (or 2 or 3) star player leaves the team

3 Empirical Results

3.1 The Impact of Star Player Turnover on Attendance

The regression results are as shown in Table 2. When players join (inClass), the influence of Class3 player's joining on the increase of the team's home attendance rate is the most significant; The influence of Class2 players joining on the change of attendance rate is not significant; However, the addition of Class1 players will lead to a decline in home attendance. On the other hand, all three types of players leaving the team had no significant effect on attendance.

In response to the above results, this paper provides the following explanation: The third category of star players defined in the article of MacDonald [10] makes a greater contribution to team value and these star players are the most talented players. The positive influence of Class3 players on the team is very significant, indicating that this kind of players do bring extra value to the team, and it is worth to take a certain way to estimate; It is uncertain whether a Class2 player can bring a certain value to the team. Such a player is an important part of the team, but it is not the key to win or lose. The composition of Class1 players is mostly rookie players, although the future can be expected, but there is still a big gap between Class2, especially Class3 players and their own competitive level, although there is a certain popularity, but for the choice of ornamental, the audience will reduce their attention. After all, the audience is not professional team related staff, they do not need to watch the growth of the players for a long time, just to watch more exciting and intense matches. As for the result that the attendance rate of the team is not significantly affected by the departure of the players, this paper argues that this is largely influenced by the fixed location of the stadium itself. Due to the immobility of the stadium, most of the people who enjoy the home stadium are local city fans, and many fans have certain loyalty to the team. The departure of a star player will not cause too much of a shock to that loyalty. From the perspective of the city, the role of star players is to arouse the enthusiasm of potential home fans to watch the game. Therefore, After the star players join, the audience includes not only loyal fans, but also new fans attracted by the star players and old fans rejuvenated by the team's excellent performance.

3.2 The Impact of Star Player Turnover on Team Value

The regression results are as is shown in Table 3.

It can be seen from the analysis results that the changes of the three class star players have no significant impact on the changes of the market value of the team, but the GDP has a significant impact on the market value of the team. As mentioned above, ticket revenue is only a small part of the total revenue of the team. Other income, such as advertising income, star endorsement income, sports product sales income and broadcasting right income, accounts for a larger proportion of the total income. The increase of ticket income cannot cover the impact of other projects, or even just drops in the bucket. Therefore, the impact of ticket income on the value of the team is not as obvious as expected. Maybe a star player's join can lead to other income growth, but it is understood that Other revenues are usually long-term contracts that management has

Table 2. The impact of star changing team on seat

	(1)	(2)	(3)
	Seat-class1	*Seat-class2*	*Seat-class3*
value	4.020**	4.154***	4.476***
	(3.29)	(3.38)	(3.66)
salary	7.672***	7.510***	7.226***
	(4.03)	(3.93)	(3.82)
GDP	-14.40*	-13.48*	-14.80*
	(-2.13)	(-1.99)	(-2.22)
pop	-38.96*	-39.59*	-39.38*
	(-2.16)	(-2.19)	(-2.19)
playoff	4.074***	3.994***	3.908***
	(5.44)	(5.29)	(5.22)
regular	-0.00909	-0.00290	-0.299
	(-0.01)	(-0.00)	(-0.47)
inclass1	-2.098*		
	(-2.14)		
outclass1	0.613		
	(0.65)		
inclass2		1.646	
		(1.76)	
outclass2		0.262	
		(0.21)	
inclass3			2.577**
			(2.86)
outclass3			-0.671
			(-0.60)
_cons	816.3**	814.4**	829.1**
	(3.01)	(2.99)	(3.06)
N	270	270	270

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

with other businesses, such as the rights and production of all kinds of sports products, star join in the team is relative to the contract but a short-term impact, and the volatility of the market value has close relationship with the economic environment, Therefore, the analysis results show that the changes of three class star players have no significant impact on the changes of team market value.

Table 3. The impact of star changing team on team value

	(1)	(2)	(3)
	value	*value*	*value*
seat	0.0111**	0.0109**	0.0112***
	(3.33)	(3.26)	(3.37)
salary	0.319**	0.328**	0.320**
	(3.16)	(3.26)	(3.16)
GDP	3.713***	3.671***	3.656***
	(14.12)	(14.03)	(13.97)
pop	2.951**	2.961**	3.110**
	(3.16)	(3.18)	(3.33)
playoff	-0.00462	-0.00350	-0.000165
	(-0.11)	(-0.08)	(-0.00)
regular	-0.0582	-0.0660*	-0.0492
	(-1.79)	(-2.03)	(-1.48)
inclass1	0.0324		
	(0.73)		
outclass1	-0.0257		
	(-0.60)		
inclass2		-0.00237	
		(-0.04)	
outclass2		-0.0734	
		(-1.22)	
inclass3			-0.0256
			(-0.50)
outclass3			0.0772
			(1.52)
_cons	-94.31***	-93.96***	-96.15***
	(-7.20)	(-7.19)	(-7.33)
N	270	270	270

t statistics in parentheses, * p < 0.05, ** p < 0.01, *** p < 0.001.

4   Conclusion

Through the special phenomenon of team turnover with creative selection of star players, this paper finds that the basketball players with the most extra talent have a significant impact on the attendance rate of the team, but not the market value of the team. This paper shows that the influence of star player changes on team value is indirect, which is consistent with the results of De Vany and Walls [11], Ravid [4] and Elberse [5] who studied the influence of stars on the financial success of movies and found that there is

little or no influence. It partly supports the conclusion that specific human capital has significant value effect.

References

1. Becker, G.S., Investment in human capital: A theoretical analysis. Journal of political economy, 1962. 70(5, Part 2): p. 9–49.
2. Bertrand, M. and A. Schoar, Managing with style: The effect of managers on firm policies. The Quarterly journal of economics, 2003. 118(4): p. 1169-1208.
3. Hamlen Jr, W.A., Superstardom in popular music: Empirical evidence. The Review of Economics and Statistics, 1991: p. 729–733.
4. Ravid, S.A., Information, blockbusters, and stars: A study of the film industry. Journal of Business, 1999. 72(4): p. 463-492.
5. Elberse, A., The power of stars: Do star actors drive the success of movies? Journal of marketing, 2007. 71(4): p. 102-120.
6. Filson, D. and J.H. Havlicek, The performance of global film franchises: installment effects and extension decisions. Journal of Cultural Economics, 2018. 42(3): p. 447-467.
7. Han, S. and S.A. Ravid, Star turnover and the value of human capital—Evidence from Broadway shows. Management Science, 2020. 66(2): p. 958-978.
8. Rosen, S., The economics of superstars. The American economic review, 1981. 71(5): p. 845-858.
9. Adler, M., Stardom and talent. The American economic review, 1985. 75(1): p. 208-212.
10. MacDonald, G.M., The economics of rising stars. The American Economic Review, 1988: p. 155–166.
11. De Vany, A. and W.D. Walls, Uncertainty in the movie industry: Does star power reduce the terror of the box office? Journal of cultural economics, 1999. 23(4): p. 285-318.