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## ORIGINAL

### CHANGING A COACH, GUARANTEE THE WIN? EVIDENCE IN BASKETBALL

### ENTRENADOR NUEVO, ¿VICTORIA SEGURA? EVIDENCIA EN BALONCESTO

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## **ABSTRACT**

This research shows that a widespread social wisdom in sports: “change the coach, guarantee the win” has an empirical basis. Obviously, this type of saying is not fully met in all the games, but the evidence derived from the analysis of changes of coaches along the NBA history reveals that the probability of winning increases in the first game managed by a new coach. Through the analysis of logit models, results show that the probability of winning a game for the first game piloted by a new coach is about 2 times higher than the probability of winning the game before the change has occurred. Implications related to variables such as home/field advantage or the quality of teams are discussed.

**KEYWORDS:** Social wisdom, basketball, change of coach, winning probability.

## RESUMEN

Esta investigación muestra que el convencionalismo tan extendido en la cultura popular deportiva “entrenador nuevo, victoria segura” tiene una base empírica. Obviamente, el tópico no se cumple siempre, pero la evidencia que se deriva del análisis de la historia de cambios de entrenador en la NBA revela que, a nivel general, es más probable que este dicho se haga realidad. A través del análisis de modelos logit, se compara la probabilidad de victoria de los equipos que cambiaron de entrenador en el partido anterior y posterior al cambio. Así, sobre un “partido tipo”, la probabilidad de victoria para el nuevo entrenador es más de 2 veces superior al último partido jugado por el equipo. Diversas implicaciones relacionadas con variables como el factor cancha o la calidad de los equipos son discutidas.

**PALABRAS CLAVES:** Convencionalismo social, baloncesto, cambio de entrenador, probabilidad de victoria.

## 1. INTRODUCTION

One of the most extending sayings within the popular sports culture, at least for people speaking Spanish, is the following; “changing a coach, guarantee the win”. A simple Google search of this sentence yields approximately 65000 outcomes, reflecting its widespread use in the mass media. This saying speaks about the immediate positive effect that a mid-season coach change yields on team performance in the first game piloted by the new coach. Although its main employment is within the soccer lexical, this saying is applied to the majority of team sports.

However, and surprisingly, under my knowledge there is no academic research trying to empirically test if this social convention is true, or at least, its degree of trust. The importance of contrasting these types of conventions (sometimes identified as prejudices), is pervasive in the last years within disciplines such as economy, sociology, psychology or marketing (e.g. Ariely, 2008; Levitt & Dubner, 2005), and also specifically for the sports economics (Berri, Schmidt & Brook, 2006; Berri & Schmidt, 2010). As Levitt and Dubner (2005) remind, the economist John Kenneth Galbraith coined that term, when he referred to persons who prefer the truths matching with their beliefs, because this make their life easier. The aim of a researcher is to challenge these seemingly immutable “social laws”.

The success of these topics has been explained by diverse psycho-social theories, as the theory of the consistency of cognition (see Ariely, 2008, Goldstein, Martin & Cialdini, 2010), the theory of social identity (see Turner, 1982) or the theory of shared mental models (see Zaltman, 2003). These social conventions help people to achieve predictions minimizing their psychological costs, and they have showed their power along the human history as Albert Einstein reflected in one of his celebrated phrases: “It is harder to crack prejudice than an atom”. The reticence of people to change their cognitive schemas, to search explanations fitting their beliefs, discarding the relevant information which do not match with their thoughts, it is a phenomenon also known as illusory correlation (Kunda, 1999), blind neglect (Punset, 2010) or simply self-defection (Von Hippel & Trivers, 2011).

However, not all of these conventions lack of foundation. It is true that in some specific cases these beliefs do not have a scientific support, but they are cognitive biases influencing negatively the predictions and choices of individuals. Nevertheless, in other cases, these beliefs may have a rational basis; and then the social conventions match with the empirical evidence. In fact, in the sports sciences, and specifically in basketball, there are investigations supporting some of these rooted beliefs, such as the existence of a momentum effect between games (Arkes & Martínez, 2011), and the prevalence of the “hot-hand” effect for shooting (Arkes, 2011). However, there is also ample evidence of opposite results in the literature (e.g. Bar-Eli, Ayugos y Raab, 2006; Vergin, 2000). Anyway, researchers employ the sophistication of

diverse statistical methods to try to provide response to interesting questions in the field of sports, in order to contrast the conventional wisdom against the empirical evidence (Reich, Hodges, Carlin & Reich, 2006).

The effect of signing a new coach on team performance is a widely studied topic in different sports: soccer (eg. Barros, Frick & Passos, 2009; Bruinshoofd & ter Weel, 2003; Frick, Pestana & Prinz, 2010; Koning, 2003; González-Gómez, Picazo-Tadeo & García-Rubio, 2011; Salomo, Teichmann & Albrechts, 2000; Tena & Forrest, 2007; Van Dalen, 1994; Wagner, 2010); american football (e.g. Brown, 1982; McTeer, White & Persad, 1995); beisball (e.g. Gamson & Scotch, 1964; McTeer, White & Persad, 1995; Scully, 1995); hockey (e.g.. McTeer, White & Persad, 1995) or basketball (ej. Fizel & D'itri, 1999; Giambatista, 2004; McTeer, White & Persad, 1995; Scully, 1995). Obviously, the main focus of these studies was to analyze if the large economic efforts (see García, 2010; Van Dalen, 2010) that teams have to make to change a coach (to pay both the replaced coach and the new coach) are justified. However, results from these studies are not homogenous, being at the opposite direction in some cases (see Koning, 2003; González-Gómez, Picazo-Tadeo y García-Rubio, 2011). Some of the aforementioned studies focus on the changes of coaches achieved between seasons, while other focus in the changes within a season. However, none of these studies analyze the specific scenario of the first game managed by the new coach. Only Tena and Forrest (2007) speak about a positive effect in the short-term, placed in the two first games new coaches manage, thus we could infer that the victory in the first game after the change could be more probable for the team changing the coach.

Special attention deserves the work of Wagner (2010). This author studied the mid-season change of coaches in the first league of soccer in Germany along 39 seasons. Although he focused on the comparison among global results for new and replaced coaches, Wagner (2010) found significant differences between results of the first match managed by a new coach and the last game managed by a replaced coach. Wagner (2010) employed an indicator of points made by teams, but he did not test any specific model to explain the change in the probability of win for these specific matches.

Regarding theories that explain the possible effect of changing a coach on team performance, there is no consensus in the literature. Therefore, and as Frick, Pestana and Prinz (2010) remember, the "Common Sense Theory", the "Vicious Circle Theory" and the "Ritual Scapegoating Theory" predict different results after the change: positive, negative and neutral, respectively. Other studies, such as Montanari, Silvestre and Gallo (2008), claim that these changes disrupt the stability of teams and the length of the relationships between team members, which is a key factor for the long-term success. Consequently, it is not clear which is the effect of changing a coach on team performance, and this is the reason why some studies focuses on building and testing mathematical models for explaining success (e.g. Giambatista, 2004; González-Gómez, Picazo-Tadeo & García-Rubio, 2011; Goodall, Kahn & Oswald, 2010).

However, there are no precedents in the literature focusing on the first match played by teams after the change.

With regard to the possible immediate effect that changing a coach could exert on a team (manifested in the first match played after the change), the popular culture of sports claims that players of these teams increase their motivation with respect to the prior game, because players think that the new coach can be an opportunity to break a negative trend. Even some players could feel the need to delight the new coach, showing their better skills and capabilities, which it would enhance their effort, and consequently, to influence performance. However, opposite arguments are also plausible. For instance, that extra emotional level yielded by the arrival of the new coach could increase the stress of players beyond the desired threshold, and therefore to negatively influence performance (Ariely, 2010).

The literature about leadership also offers some responses to this dilemma, assuming that the coach is the leader of a group of players. Therefore, Yaffe and Kark (2011), claim that the social influence of leaders exerted on groups is determined by the degree of these leaders represent the group as a whole and joined entity, represent the collective identity of the group and they are highly prototypical. Consequently, different profiles of coaches might yield different effects on team performance, although it would be complex to say that these changes would be manifested in such short period of time. Recall that sometimes the new coach do not have time enough to be integrated into the team, because he has few days (usually below seven days) to develop his work before his first match. However, from a psychological viewpoint, an assimilation effect might also arise. Therefore, if the players of a team desire his coach should be fired, and they think that the new coach is going to be better than the replaced coach, then they could generate high expectations regarding the new coach. If the assimilation process occurs, then the instructions of the new coach would be better acquired, and his role better accepted, so that players' confidence and motivation could be enhanced.

Therefore, and considering the commented theories and often contradictory explanations, this research analyzes empirically the effect of incorporating a new coach on the first match played by his team. To accomplish this aim, several statistical models were run, in order to analyze if the model depicting the probability of winning that first game differs from the model depicting the probability of winning in the previous game, i.e. the last match played by the replaced coach. This statistical framework allow to control by several variables which help to understand the determinants winning a game (quality of teams, rest days, team momentum, home advantage, etc.). In addition, some features of the new coach are also considered, as the level of expertise or the winning curriculum. All these analyses were achieved on a the 203 mid-season changes occurred in the NBA along its history, from 1950 to 2010.

Consequently, this research provides a noticeable contribution to sports sciences, because it is the first study confronting one of the most rooted beliefs

in sports with the empirical data that comes from one of the most important professional leagues in the world: the NBA.

## 2. METHOD

### 2.1. DATA

Data were gathered from [www.basketball-reference.com](http://www.basketball-reference.com), the most outstanding free resource of basketball statistics. Browsing across the data base of coaches participating in the NBA since its inception, those who were signed once a season had been started were selected. A total of 203 changes were found in the 61 analyzed seasons, from 1950 to 2010.

### 2.2. MODEL

In order to analyze the existence of an effect on the probability of winning the first match managed by a new coach, a logistic regression model was built, with

the following specification:  $\ln\left(\frac{y_i}{1-y_i}\right) = \beta_0 + \sum_k \beta_k X_{ki} + e_i$  where  $X_{ki}$  is a set of

covariates,  $\beta_0$  and  $\beta_k$  are the coefficient to be estimated, and  $e_i$  is a random error with zero mean and uncorrelated with covariates. All the variables selected are defined as follows:

1. The first variable is the difference between the winning percentage of teams involved in the specific match, in the moment of the game X1\_A, and at the end of the season X1\_B. Arkes and Martínez (2011) or Reed and O'Donohue (2005) justify the importance of this variable as an indicator of the difference of quality between two teams. As Martínez (2011) shows, the winning percentage of teams in each moment of the season begins to be a good estimator of its final value when teams have played approximately 15 games in the NBA. Obviously, this finding is based on the assumption that teams tend to reach to their real level of quality, so that 82 games is a number of games enough to calibrate the quality of a team, beyond factors derived from luck, injuries, etc. These latter factors would complicate the inference of the quality of a team taken from a small sample of games. The problem of considering the percentage of victories at the end of the season, X1\_B, is that this is an unknown variable at the moment of changing a coach; therefore, it is a good variable to consider when constructing explicative models, but not when constructing predictive models. Both variables X1\_A and X1\_B are ranged in a continuous interval [-1,1].
2. If the game is played at home vs. away (X2). Winston (2009) or Koning (2003) show the importance of home field advantage.

3. The absolute value of the difference between the winning percentage of both teams transformed employing an exponential parameter  $X_3 = |X_1|^{1/\lambda}$ . Martínez (2010), considering the results of Koning (2003), shows that in the NBA exists interaction between the home field advantage and the quality of teams. Low quality team are relatively stronger at home than high quality teams. Therefore, the difference of team quality could not reflect a factor related with the “quality” of the game. For example, if the difference of quality between teams is 0.5, this could be due to the winning percentages of both teams are 1 and 0.5, or they are 0.6 and 0.1. For both cases, the difference of quality is 0.5, in the former case, the quality of this game is superior to the quality of the latter game, because globally, the first two teams are better than the second two teams, and this fact could influence results. The exponential parameter  $\lambda$  to address, is employed to address this fact, thus quality factor of a game = |difference of quality between teams| $1/\lambda$ . Therefore, this variable increases to the extent that the winning percentage of the two teams increases, and it is also a continuous variable ranged in a in a [0,1] interval
4. The difference of rest days before the match,  $X_4$ . Reed and O’Donohue (2005) suggested counting with this variable to study factors affecting performance in sports. However, Arkes and Martínez (2011) did not find an important effect of this variable on the probability of winning a game. We have considered this variable using four categories. The first three categories reflect one, two and three rest days between games, and the fourth category includes the situation when players rest four or more days from one game to another.
5. The difference between trends of wins and losses,  $X_5$ . Arkes and Martínez (2011) showed there was evidence for a momentum effect in the NBA teams, i.e. positive or negative trends in results could positively or negatively influence the outcome of a subsequent game for that team, other things being equal.
6. The level of expertise and skills of the new coach, reflected in the years managing NBA teams and their winning percentage. Salomo, Teichmann and Albrechts (2000), Giambatista (2004) or Barros, Frick and Passos (2009) have shown the relevancy of this variable. In this case, the procedure depicted by Martínez (2010) was followed, where the years of experience and the winning percentage were transformed employing a calibrated sigmoid function, with the aim to obtain a S-shaped curve, which is a characteristic curve of learning process. Therefore, an index reflecting the quality of the new coach was obtained,  $X_6$ , within an interval [0,2].
7. Finally, the experience of the new coach as former player of the NBA,  $X_7$ , was considered. Following Goodall, Kahn and Oswald (2010), it

should be expected that coaches being good former players are better coaches than others not fulfilling this condition. As Martínez (2010) indicates, the number of season the coach played in the NBA is an indicator which works alike other more complex indicators of experience, based on minutes played or productivity.

The philosophy of analysis was the following: First of all, a model employing the first five covariates was tested to explain the probability of winning the game before the replacement was achieved. Once the model was fitted, if the effect of signing a new coach is negligible, then the parameters of the first model should be invariant when tested in the second model (subsequent game), keeping a similar predictive accuracy. If this condition does not hold, then the following step would be testing a new model, by adding the covariates X6 and X7, in order to analyze the influence of the features of the new coach on the probability of winning that game.

We applied the philosophy of analysis of Mayo (1996) and Spanos (2007; 2010), in order to achieve an inductive process of learning from data, using a statistical model and testing the assumptions regarding error. Model should account with data regularities, obtaining a white noise error term, i.e. a random component without systematic contamination. Therefore, reliability of the model is primary addressed by testing the assumptions using miss-specification tests. This criterion prevails against any index of predictive accuracy of the model (e.g. explained variance, classification error, AIC, ROC curve, etc.). Only if assumptions about the error term are met among disparate models, then model selection may be made using the best predictive accuracy.

As we used logistic regression, this is a low-demanding method regarding assumptions (Tabachnick and Fidell, 2007). This technique assumes linearity in the logit and independence of errors. For studying the first assumption, we used graphical representation of the logit. For studying the second assumption, we used the Wald-Wolfowitz (WW) runs test applied to the sign of residuals (see Spanos, 2010). The structural homogeneity of the model was explored using a latent class analysis (Vermund and Magidson, 2005).

In order to improve the homogeneity of the sample, before comparing both models (the last game managed by the replaced coach vs. the first game managed by the new coach), the cases where the new coach obtained significantly better results than the replaced coach were dropped. The procedure implemented to reach this conclusion is explained by Martínez (2010), and it is based on the comparison between the winning percentage obtained by both coaches (replaced vs. new) employing the binomial test. Therefore, all the coaches finally considered in the analysis have a similar pattern of influence on teams' results, i.e. on the long term; the new coaches did not significantly increase or decrease the performance of their respective teams.

Finally, those games played on a neutral location were also eliminated, because obviously could distort the effect of the variable related to the home field advantage. In addition, cases where the change occurred when one of the two teams playing the match did not play 15% of the games of the season were also dropped, following the previous commented reasoning about the validity of the winning percentage as an indicator of the quality of teams.

### 3. RESULTS

Ninety of the 203 changes occurred (44.33%) yielded a victory for its respective teams in the first game managed. In the previous game, the replaced coaches only won 36 of these games (17.73%). At a glance, it seems that the difference is obvious, but other factors should be considered susceptible to explain this divergence. For example, new coaches played 129 games at home (63.54%) against 93 of the replaced coaches (45.81%). As the home field advantage plays an important role to decide the final result of a game, then it is necessary to control by all these potential factors in the statistical model proposed.

Several logistic regression models were tested using the programs Stata 8.0 and Latent Gold 4.0. Valid cases were only 126, after applying all the filters aforementioned in the method section. Table 1 shows the results of the estimations and the marginal effects (computing at means of the variables). Recall that marginal effects should be interpreted as effect sizes. Models A and B were tested, being the A models those considering the winning percentage of teams at the moment of the match, and the B models at the end of the season. The numbers 1 and 2 refer to the last game managed by the replaced coach and the first game managed by the new coach, respectively.

**Table 1.** Results from the estimated models

	Model 1 A	Marg eff.	Model 1 B	Marg eff.	Model 2 A	Marg eff.	Model 2 B	Marg eff.
% Successful cases	80.16%		83.33%		73.02%		69.84%	
Gain with respect to the null model	1.59%		4.76%		17.46%		14.28%	
Deviance	105.58		94.71		144.94		140.31	
ROC	80.28%		84.25%		76.61%		77.40%	
Test WW	-1.71		-1.71		-0.04		-0.04	
BIC (LL)	134.60		123.72		173.96		169.33	
Invariant test					-15.08%		-7.10%	
Prob. Winning	0.165		0.147		0.422		0.423	
Prob. Winning (home)	0.283		0.227		0.552		0.560	
Prob. Winning (away)	0.086		0.088		0.191		0.182	
Intercept	-0.77*		-0.92*		0.89*		0.77*	
X <sub>1</sub>	5.04*	0.70*	6.81*	0.85*	2.66*	0.65*	4.73*	1.15*
X <sub>2</sub>	-1.42*	-0.20*	-1.11	-0.14	-1.65*	-0.36*	-1.75*	-0.38*
X <sub>3</sub>	1.92	0.27	1.93	0.24	-2.16	-0.52	-0.64	-0.16
X <sub>4</sub>	-0.18	-0.03	-0.16	-0.02	-0.002	-0.001	0.05	0.01
X <sub>5</sub>	-0.02	-0.003	-0.02	-0.003	0.013	0.003	-0.003	-0.001
X <sub>6</sub>						0.04		0.04
X <sub>7</sub>						-0.009		-0.01

\*p<0.05

**% Successful cases:** Percentage of cases correctly classified by the model.

**Gain with respect to the null model:** Difference between the percentage of cases correctly classified by the model and the a model with only a intercept.

**Deviance:** It is a measure of divergence between the specified model and the saturated model.

**ROC:** Area under the ROC curve. It is a measure of the soundness of the model.

**Test WW:** Wald-Wolfowitz run test for the sign of the residuals.

**BIC (LL):** Bayesian Information Criteria computed from the logarithm of the likelihood. The lower the BIC the better the model..

**Invariant test:** Coefficients estimated of Model 1 (A and B) were fixed and then computed the predicted value of the Model 2 (A and B) employing the same coefficients. Then, the percentage of cases correctly classified is computed and thus compared with the percentage obtained with the real estimated coefficients. A negative value indicates a loss in the percentage of cases correctly classified.

All models got an acceptable fit, because of the p-value associated with deviance was non-significant. Moreover, the WW test for analyzing the independence of residuals yielded non-significant values. On the other hand,

the BIC-LL was compared for each model with different estimations characterized by diverse latent classes (up to 4), being the reported in Table 1 the lowest of them. Therefore, the assumption of the homogeneity of parameters seems to be supported by data.

Once checked the fit of the models, the next step is its interpretation. First of all, regarding Models 1A and 2A, the invariance test reports a considerable loss of classification accuracy (-15.08%). Therefore, the estimated parameters in the Model 1A do not get a proper level of prediction in the Model 2A, which may be a signal of divergence of parameters between both models. Actually, where this difference may be appreciated is in the marginal effects of X2 and X3, because for the remaining variables the divergence is very small. For the Model 2A (first match of the new coach), the effect of playing at home is almost twice higher than for Model 1A, i.e. the probability of winning the game diminishes noticeably (from 20 to 36%) whether the game is played away instead of at home. Indeed, the effect of X3 is higher and has the opposite direction, i.e. the probability of winning is higher if both teams have low quality.

These results indicate that there exists a change in the effect variables produce on the probability of winning, which is mainly reflected in the following statement: In the first game managed by a new coach, his team has a higher probability of win if his team is playing at home and against a low quality team, compared to if this same scenario would be a reality for the replaced coach. Similar conclusions are obtained when comparing the version B of both models, i.e. when using the total winning percentage at the end of the season.

It is also noteworthy that, for all tested models, the effect of rest days or team momentum is small, which means that these variables do not have an important effect on the probability of win. However, the main effect is yielded for the difference of quality between teams.

Regarding the profile of the new coach, Models 2A and 2B were tested, by adding the variables X6 and X7. For the Model 2A, the percentage of cases correctly classified increased from 73.02% to 75.40%, although the marginal effects were small. Therefore, signing a new coach con high experience in the NBA and with a long successful career increase the probability of winning by a small quantity (marginal effect of 0.04). Similar results were found for the Model 2B, with an increase of the percentage of correctly classified cases below 2% (from 69.84% to 71.43%), and alike marginal effects.

Consequently, and as Table 1 shows, the probability of winning the first game after a coach change is more than 2.5 times higher than the prior game (0.165 y 0.147 vs. 0.422 y 0.423), being this probability computed over the mean values of covariates. In addition, if marginal effect of the first game managed by the new coach are computed employing the mean values of the situation before the change, the probability of win increase by more than 2 times (0.165 and 0.147

vs. 0.348 and 0.333), so that in identical conditions, the probability of winning is more than twice higher.

Finally, all models were run again adding interactions among covariates, but results did not change significantly.

#### 4. DISCUSSION

This research has shown that the popular saying “change the coach; guarantee the win” has an empirical support. Obviously, this claim is not always true, but the evidence that comes from the analysis of the history of the NBA reveals that it is more probable that this saying comes true.

And this fact is produced by two fundamental reasons; the majority of changes are accomplished before the team play the subsequent game at home and within teams with poor performance (low winning percentage). As these two variables change in with a higher strength with respect to the model explaining the wins in the previous game, these results seems expected. Therefore, over a prototypical game, the probability of winning for the new coach is twice higher than the last game played by his team, i.e. the previous game managed by the replaced coach. This means a relevant shift on performance after the change.

Moreover, this change in the probability of win is low influenced by the features of the new coach. A profile characterized by high expertise, great curriculum and experience as former player yields a small marginal effect compared with the three main variables of the model.

Therefore, these results are in line with Tena and Forrest (2007) regarding the short term improvement in the performance of teams which change the coach before the season ends. However, this does not mean that this short-term improvement translates into a long-term and significant improvement, as Martínez (2010) finds (only 15% of new coaches significantly improves the winning percentage of the replaced coaches). Indeed, results are in agreement with the work of Wagner (2010), regarding points produced.

Consequently, the improvement of team performance when the coach is replaced is mainly motivated by a psychological factor, what Koning (2003) labels as “shock effect”, and what further research might analyze deeply. Qualitative studies could help to enlighten the reasons why this effect is produced. The literature of leadership and assimilation of expectations (previously discussed) could be a good starting point to begin the analysis, but others perspectives could also be taken into account. Therefore, from a viewpoint related to economics, an explanation based on the concept of incentives may be plausible (Ariely, 2010). Players would need to show their skills to the new coach to highlight their value within teams, a value which probably was questioned before the change. From a viewpoint closer to psychology, the metaphor of change explained by Zaltman and Zaltman (2008)

is postulated as another attractive line to work. Human beings live in a constant paradox between the wish of stability (safety) and change (hope), being this equilibrium broke to the wish of change in situations of emotional crisis, such as when a athlete performs below expectations. This hope of change could make players enhance significantly their performance, even in a non-conscious way, as Lindstrom (2008) suggest from his neuroscience studies.

Another implication is related with betting markets. Some companies benefit from known cognitive bias in the bettors (e.g. unreal belief about team momentum) to adjust their predictions (Sinkey and Logan, 2010). Further research could analyze if in first game managed by new coaches this fact is also manifested. On the other hand, it seems clear the profits bettors could obtain after knowing how the probability of winning these types of games by both teams vary.

Generalization of results has to be made with caution. Recall that the NBA has specific conditions, many of them different from other professional leagues around the world. However, the large amount of free data available regarding NBA statistics has made this research possible, what would have been very difficult to carry out in other competition. Considering this fact, the main limitation of this research is the lack of statistical power to obtain clearer results. As the final sample size was 126, this number is insufficient to detect small effect sizes, when admitting an infinite population framework for inference. Therefore, some variables had no significant effect on the probability of winning, because, probably, to the lack of power. For example, Arkes and Martínez (2011) obtained evidence for a momentum effect in the NBA, a small effect size (only about 3-4%) after analyzing some thousands of cases.

Nevertheless, and taking that shortcoming into account, this research has analyzed a full directory of cases (valid cases following the methodology achieved) in a professional competition, and not any sample of them. Therefore, it would not be necessary any criterion based on statistical inference to evaluate results. Consequently, this research has shown that there is enough evidence to claim that the saying “change a coach; guarantee the win” contains a more rational than an irrational ground.

## REFERENCES

- Ariely, D. (2008). *Predictably irrational: The hidden forces that shape our decisions*. Harper Collins.
- Arkes, J. (2010). Revisiting the hot hand theory with free throw data in a multivariate framework. *Journal of Quantitative Analysis in Sports*, 6 (1), Article 2.
- Arkes, J. & Martínez, J. A. (2011). Finally, Evidence for a Momentum Effect in the NBA. *Journal of Quantitative Analysis in Sports*, 7 (3) Article 13.
- Bar-Elia M, Avugos S. & Raab M. (2006). Twenty years of “hot hand” research review and critique. *Psychology of Sport and Exercise*, 7, 525-553.
- Barros, C. P. Frick, B., & Passos, J. (2009). Coaching for survival: the hazards of head coachcareers in the German “Bundesliga”. *Applied Economics*, 41 (25), 3303-3311
- Berri, D. J., & Schmidt, M. B. (2010). *Stumbling on wins: Two economists expose the pitfalls on the road to victory in professional sports*. FT Press.
- Berri, D. J., Schmidt, M. B., & Brook, S. L. (2006). *The wages of wins: Taking measure of the many myths in modern sport*. Palo Alto,CA: Stanford University Press.
- Brown, M. C. (1982). Administrative succession and organizational performance: The succession effect. *Administrative Science Quarterly*, 27, 1–16.
- Bruinshoofd, A., & ter Wel, B. (2003). Manager to go? Performance dips reconsidered with evidence from Dutch football. *European Journal of Operational Research* 148, 233–246.
- Fizel, J. L. & D’itri, M. (1999). Firing and hiring of managers: does efficiency matter? *Journal of Management*, 25, 567-585.
- Fizel, J.L., & D’itri, M. (1996). Estimating managerial efficiency: the case of college basketball coaches. *Journal of Sport Management*, 10, 435–445.
- Frick, B., Pestana, C., & Prinz, J. (2010). Analysing head coach dismissals in the German “Bundesliga” with a mixed logit approach. *European Journal of Operational Research*, 200, 151-159.
- Gamson, W., y Scotch, N. (1964). Scapegoating in baseball. *American Journal of Sociology*, 70, 69–72.
- García, A. (2010, April, 11). Influence of quality coaching shouldn't be overlooked. Downloaded from [http://www.nba.com/2010/news/features/art\\_garcia/04/11/coaching/index.html](http://www.nba.com/2010/news/features/art_garcia/04/11/coaching/index.html)
- Giambatista, R.C. (2004). Jumping through hoops: A longitudinal study leader life cycles in the NBA. *The Leadership Quarterly*, 15, 607-624.
- Goldstein, N. J., Martin, S. J., & Cialdini, R. B. (2010). *Yes! 50 scientifically proven ways to be persuasive*. Free Press: New York.
- González-Gómez, F., Picazo-Tadeo, A., & García-Rubio, M. A. (2011). The impact of a mid-season change of manager on sporting performance. *Sport, Business and Management: An International Journal*, 1 (1), 28-42.

- Goodall, A. H., Kahn, L. M., & Oswald, A. J. (2010). Why do leaders matter? A study of expert knowledge in a superstar setting. *Journal of Economic Behavior & Organization*, doi:10.1016/j.jebo.2010.11.00.
- Horowitz, I. (1994) On the manager as principal clerk. *Managerial and Decision Economics*, 15, 413–419.
- Kahn, L. M. (2006). Race, performance, pay and retention among National Basketball Association head coaches. *Journal of Sports Economics*, 7 (2), 119-149.
- Koning, R. H. (2003). An econometric evaluation of the effect of firing a coach on team performance. *Applied Economics*, 35, 555-564
- Kunda, Z. (1999). *Social Cognition: Making Sense of People*. MIT Press.
- Levitt, S. D. y Dubner, S. J. (2005). *Freakonomics: A rogue economist explores the hidden side of everything*. William Morrow: New York.
- Lindstrom, M. (2008). *Buyology. Truth and lies about why we buy*. New York: Doubleday.
- Martínez, J. A. (2010). Does mid-season change of coach improve team performance? Evidence from the history of the NBA. *Working paper. Universidad Politécnica de Cartagena*.
- Martínez, J. A. (2011). El uso del porcentaje de victorias en modelos predictivos en la NBA. *Revista Internacional de Derecho y Gestión del Deporte*, 13
- Mayo, D. G. (1996). *Error and the Growth of Experimental Knowledge*. University of Chicago Press.
- McTeer, W., White, P.G., & Persad, S. (1995). Manager/coach mid-season replacement and team performance in professional team sport. *Journal of Sport Behaviour*, 18, 58–68.
- Montanari, F., Silvestri, G., & Gallo, E. (2008). Team performance between change and stability: The case of Italian Serie A. *Journal of Sport Management*, 22, 701-716.
- Punset, E. (2010). *Viaje a las emociones*. Ediciones Destino: Barcelona..
- Reed, D., & O'Donoghue, P.G. (2005), Development and application of computer-based prediction methods. *International Journal of Performance Analysis of Sport (e)*, 5 (3), 12-28
- Salomo, S., Teichmann, K., & Albrechts, C. (2000). The relationship of performance and managerial succession in the German Premier Football League. *European Journal of Sport Management* 7, 99-117.
- Schmueli, G., Patel, N. R. y Bruce, P. C. (2007). *Data Mining for Business Intelligence: Concepts, Techniques, and Applications in Microsoft Office Excel with XLMiner*. New Jersey: Wiley.
- Scully, G. W. (1995). *The Market Structure of Sports*. University of Chicago Press: Chicago.
- Sinkey, M., & Logan, T. (2010). Does the Hot Hand Drive the Market? Evidence from Betting Markets. *Working Paper. Ohio State University*.
- Spanos, A. (2007). Curve fitting, the reliability of inductive inference, and the error- statistical approach. *Philosophy of Science*, 74, 1046–1066.
- Spanos, A. (2010). The discovery of Argon: A case for learning from data? *Philosophy of Science*, 77 (3), 359-380.

- Tena, J. D., & Forrest, D. (2007). Within-season dismissal of football coaches: Statistical analysis of causes and consequences. *European Journal of Operational Research*, 181, 362-373.
- Van Dalen, H. P. (1994) Loont het om een voetbaltrainer te ontslaan? *Economisch Statistische Berichten*, 79, 1089–1092
- Van Ripper, T. (2010, May 21). The highest-paid coaches in sports. Downloaded from <http://www.forbes.com/2010/05/21/phil-jackson-belichick-mike-shanahan-business-sports-coaches.html>
- Vergin, R. (2000). Winning streaks in sports and the misperception of momentum. *Journal of Sport Behavior*, 23 (2), 181-197.
- Vermunt, J., & Magidson, J. (2005) *Latent GOLD 4.0 User's Guide*, Statistical Innovations Inc, Belmont, Massachusetts.
- Von Hippel, W., & Trivers, R. (2011). The evolution and psychology of self-deception. *Behavioral & Brain Sciences*, 34, 1-56.
- Wagner, S. (2010). Managerial succession and organizational performance—Evidence from the German Soccer League. *Managerial and Decision Economics*, 31 (6), 415-430.
- Wooldridge, J. M. (2003). *Introducción a la econometría: Un enfoque moderno*. Thomson, Segunda Edición
- Yaffe, T., Kark, R. (2011). Leading by example: The case of leader ocb. *Journal of Applied Psychology*, 96 (4), 806-826.
- Zaltman, G. (2003). *How customers think: Essential insights into the mind of the markets*. Boston: Harvard Business School Press
- Zaltman, G., & Zaltman, L. (2008). *Marketing Metaphoria: What deep metaphors reveal about the minds of consumers*. Boston: Harvard Business School Press.

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