PONTIFÍCIA UNIVERSIDADE CATÓLICA DO RIO DE JANEIRO

DEPARTAMENTO DE ECONOMIA

MONOGRAFIA FINAL DE CURSO

SHOULD HE STAY OR SHOULD HE GO?

HEAD COACHES TURNOVER IN BRAZILIAN FOOTBALL 2014-2019

Daniel Adriano Carvalho Barbosa

Nº de Matrícula: 1610703

Orientador: Gustavo Gonzaga

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Declaro que o presente trabalho é de minha autoria e que não recorri para realizá-lo, a nenhuma forma de ajuda externa, exceto quando autorizado pelo professor tutor.

Daniel Adriano Carvalho Barbosa

As opiniões expressas neste trabalho são de opinião única e exclusiva do autor.

Acknowledgements

First of all, I would like to thanks Gustavo for being my advisor and getting excited about this research idea. This was an idea first presented by him, became my first academic article as a PET program thesis and here comes as a first draft of our paper. There is still much more to do, but his enthusiasm as a researcher and amazing classes already inspired me during undergrad time and will certainly afterwards. Thanks for always being so gentile and kind during all those years at PUC.

To my parents, to whom I own all the affection and care during my 22 years of life. Their support certainly made life easier during this start on my academic journey. Specially to my father, I am grateful for bringing me to the Maracanã stadium when I was only 2 years old. The passion for football and for Fluminense was certainly inspirations for developing on this paper topic.

To my grandfather Hertus, who has always been a source of inspiration during all my life. It has always been an amazing source of wisdom and inspiration to spend my time with him. Thanks for all the emotional and financial support; without the latter, the start of this journey would have been way more difficult, if not impossible.

To Pedro Souza and Thiemo Fetzer. The opportunity to work with them was amazing to my development as an academic researcher. I am also thankful for being supportive during all our talks.

Some other professors also deserve mention: Rogério Werneck for all the support and kindness during our talks in undergrad time. Arthur Bragança for the opportunity of working in the Climate Policy Initiative. Maína Celidônio for being a source of inspiration and amazing teacher. Maria Gabriela Carvalho for the Economic History classes and giving me more will to read books than I would be able to.

To all my friends at PUC. Maria Oaquim for being an inspiration as a brilliant col-

league and for all the time spent discussing about research and how could we contribute to a better world as citizens and professionals. To Bernardo Fernandes, Victor Borges and Omar Ghazi for all the time spent together, even the drive from and to PUC that made undergrad time even more enjoyable.

Finally, to all professors and staff from PUC's Economic Department. Special mention to Priscilla, Bianca and Nazareth for helping us with daily academic life. The help to organize events for the Economics Student Association was also fundamental. The department will always fell a bit like home to me.

Abstract

Barbosa, Daniel Adriano Carvalho; Gonzaga, Gustavo (Advisor). **Should he Stay or Should he Go? Head Coaches Turnover in Brazilian Football 2014-2019**. Rio de Janeiro, 2020, 37 p.– Departamento de Ciências Econômicas, Pontifícia Universidade Católica do Rio de Janeiro

We investigate the impacts of turnover of head coaches upon team performance in the contexto of brazilian football. Since team's outcomes in a given season are important determinants of revenues and potential goals for next seasons, we try to examine empirically if replacing the head coach is an efficient way to increase performance. Importantly, we try to deal with selection into turnover by relying on within team-season variation and by comparing teams in similar positions on the table. Our preferred specification shows that teams that replace the head coach experience an increase in 30% in the probability of winning at least two of the 6 games following a turnover. These impacts seem to hold for teams at top positions, but do not for teams at bottom of the table. For those, the impacts of turnover seem to be null or at least a decrease in the probability of losing a subsequent match. Further analysis will add non-parametric methods to deal with selection bias.

Keywords

Football; Head Coach; Turnover

Resumo

Barbosa, Daniel Adriano Carvalho; Gonzaga, Gustavo (Orientador). **Should he Stay or Should he Go? Head Coaches Turnover in Brazilian Football 2014-2019**. Rio de Janeiro, 2020, 37 p.– Departamento de Ciências Econômicas, Pontifícia Universidade Católica do Rio de Janeiro

O artigo busca investigar os impactos da troca de treinadores sobre a performance dos times no contexto do futebol brasileiro. Uma vez que o resultado dos times na temporada são determinantes importantes da sua receita e potenciais objetivos na temporada seguinte, nós examinamos empiricamente se trocar o treinador é uma maneira eficiente de aumentar a performance. O artigo busca lidar com a seleção na troca ao explorar variação entre time-temporada, assim como comparar times em posições similares na tabela. A especificação preferida encontra que trocar o treinador leva aumenta a probabilidade de ganhar ao menos dois dos 6 jogos seguintes à troca em 30%. Esse impacto advêm de times em melhores posições na tabela, enquanto para os que estão em posições mais abaixo, a troca traz resultados nulos ou ao menos diminui a probabilidade de perder uma partida. Próximas versões da análise vão adicionar métodos não-paramétricos para lidar com o viés de seleção.

Palavras-Chave

Futebol; Técnico; Troca; Campeonato Brasileiro

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1 Introduction

There is a large interest in the economic literature on which factors may drive unity and cohesion between large groups of people. Recent evidence has shown that football can, through collective action, improve feelings towards other ethnic groups in the context of Africa (Depetris-Chauvin et al., 2020). Wilson (2018) also suggests through historical analysis that football acted as a main driver of nation image building in the context of Argentina. Therefore, we can think of the sport as a relevant cause to one's subjective well being.

Given this fact, it is important to understand how the sport is managed. Football can be interpreted as a market, being the firms its clubs. Since each fan usually support a given institution, we can interpreted their individual outcomes impacting its fan's subjective well being. In addition, good results also translates in higher revenues for the institution, which can determine future investment capacity and debt management. Therefore, understanding how to improve club performance in an efficient manner is fundamental.

Our paper aims to answer this question through the lens of managerial actions. As in companies CEO's and executives are responsible for setting organizational goals, rules and *modus operandi*, a clubs's board members and head coach are also responsible for setting institutional objectives. Specifically, head coaches play a fundamental role, since they are the ones who select players for the matches, prepare tactics depending on the opponent and can also influence performance and behavior through training sessions.

From a theoretical point of view, one should expect that the objective function of the managerial board of the club is to maximize club's outcome depending on a given discount rate for distant results. Therefore, replacement of a head coach may

arise when, given the set of information available to the board, team's current and predicted performance is below what should be expected with current inputs. However, as early suggested by Gamson and Scotch (1964), replacement may also occur when the board is willing to satisfy outside demand for results (media and/or fans) or to drive attention away from real causes of poor performance. This may suggest either the inclusion of social image concerns inside board's member preferences or a non-standard format. In the latter case, boards member would derive utility not only from the actual performance of the club, but also from other's perception of the clubs performance relative to their actions.

In addition, turnover could also arise under informational asymmetry. If board members cannot properly observe players quality and infer their types, turnover could be optimal under low performance since board members would likely attribute this performance to the coach instead of players. However, if we assume that they do not observe player quality, it also stand to reason that they do not have proper knowledge of the matching function between coach and players. Therefore, board cannot predict if the new coach would either have a good or a bad match to players, which would generate good or bad results respectively. Moreover, it could also be the case that in the latter they also disrupt previously built social capital between players and the former coach, generating even worse results (Gamson and Scoth (1964) and Hoffler and Sliwka (2003))[1].

From an empirical perspective, the previous literature have found ambiguous impact of coach's replacement upon club's performance. In the context of English and Dutch football leagues respectively, Audas, Dobson and Goddard (2002) and Bruinshoofd and ter Weel (2003) found negative results of within season changes, while De Paola and Scoppa (2011) found no impact over teams performance in the

[1]Assuming no knowledge of the matching function but full observability of player quality, turnover should also be expected since, conditional on player's quality homogeneity, the new coach could enhance short-term focus driven performance increase (Hoffler e Sliwka, 2003)

Italian league. It is important to notice that, even in the absence of *average impacts*, the replacement can still be the rational decision to take under heterogeneous effects.

As suggested by Goodall et al. (2011), coaches success as a player seem to increase performance. Bridgewater et al. (2011) takes this hypothesis one step further and concludes that coaches success as a player seeem to increase the performance of poor quality teams (as measured by club's wage bill) and experience as a head coach increase good quality team's performance. Additionally, not only experience as a head coach may be important *per se*, but also his record. We call these expertise channels as "coach as a player" and "coach as a coach".

We exploit variation in the quits of head coaches in professional soccer to identify the effects that one such leader can exert upon players. Using detailed player-coach-match level data on brazilian football from 2014 and 2019 we aim to discuss the previous theoretical channels, but mainly properly causal effects. As discussed, turnover decision is endogenous to previous performance and to players and clubs characteristics. Therefore, naive estimates of the effects are likely to suffer from selection bias. Despite recent attempts to deal with this issue using fixed effects in De Paola and Scoppa (2012), newly econometric techniques that combine regression estimators with propensity score are available (see Callaway and Sant'Anna, 2018). We will employ this new estimators and compare then to Two-Way Fixed Effects to add robustness to our results in future versions of this paper. In addition, we may also explore rich data on player performance, disentangling the heterogeneity of turnover conditional on player and coach characteristics.

Approaching the question through a two-way fixed effect event study design, we show that turnover seem to either benefit or not harm team's performance. Clubs at the top of the table seem to benefit more when replacing a coach, increasing their probability of winning a game and scoring more and suffering less goals. If anything,

they reduce their probability of losing a game. Later versions will look through mechanisms to better understand these effects.

The rest of the paper is organized as follows: Section 2 describes the data, present some descriptive statistics; Section 3 present the empirical strategy; Section 4 shows our main results and describe the robustness that will be eventually added to the paper; Section 5 concludes and Section 6 includes figures.

2 Data

2.1 Context

Brazilian football start in January-February and finishes in early December. Team's first play in regional championships (*Campeonatos Estaduais*) from the beggining of the year until late April (early May) when the National Championship begins. Throughout the year, both national (Brazilian Cup or *Copa do Brasil*) and intercontinental (*Libertadores* and *Sudamericana*) playoff championships also take place, with teams dividing attentions between these different touranments. It is important to notice that the focus of the team in a given year depends on circumstances and objectives for the year. Since we do not have observations for all these championships, our analysis of turnover impact should be interpreted with caution. It may be the case that an early season turnover in the National Championship is due to elimination in a playoff or to bad performance in regional championships. However, we have good reasons to believe that the National Championship represents the highest-stakes competition for the team, for instance determining next season propects and revenue sources.

The Brazilian National Championship (*Campeonato Brasileiro Série A*) is the main league managed by the Brazilian Football Federation (*Confederação Brasileira de Futebol - CBF*). Since 2003, the league is played in 38 round, in which each of the 20 teams face the other 19 in home and away matches.[2]. The outcomes at the end of the season depends upon the sum of the number of points obtained throughout the league (a win gives the team 3 points, a draw gives 1 and a loss gives none). The biggest pointer is the champion, the first four classify for the *Libertadores* (Latin America equivalent to the UEFA Champions League in Europe) [3] in the next year; the first

[2]Before 2003, the league was disputed in playoff between teams. During transition to the new model with two direct matches between every team, the rules of relegation from and promotion to *Serie A* suffered some alterations in the number of teams until 2006, when it established into the current situation.

[3]Historically, the first four classify for the continental championship plus the *Copa do Brasil* cham-

6 that do not classifiy for the *Libertadores* go to the *Sudamericana* (equivalent to the UEFA Europa League) and the last four are relegated to *Serie B* in the next year. In other words, $1^{st} - 4th$ play the *Libertadores*, $5^{th} - 10^{th}$ play the *Sudamericana* and $17^{th} - 20^{th}$ are relegated to *Serie B*[4].

This is important, since outcomes at the end of the year not only impact clubs through earned title or continental championships prospects, but also have important revenue impacts. A relegation severely impacts a board's capacity to form a competitive team in the next season through a decay in revenues and prestige. In addition, it may also impact reelection probability of current board members in the club. Therefore, it is not surprising that facing the prospects of not reaching a continental competition next year or (more importantly) being relegated, club's board may look for ways to improve performance in the short term. If the theoretical channels we discussed in the introduction are in action, headcoach turnover may be seem as a potential way to increase outcomes. Our paper see if this hypothesis hold empirically[5].

2.2 Data Sources

Our data comes from the Cartola FC API[6]. Cartola is a fantasy football game that started to cover the Brazilian National Championship (Campeonato Brasileiro Serie A) in 2004. However, due to API data availability, we have data from the 2014 to 2019 championships. Given the discussion in the subsection above, this gives us 6 seasons with 20 teams that face each other (38 rounds), which results in 4560 team-

pion; however, recent rules added more spots for the *Libertadores*. We will consider sensitivity for these changes in future versions of our main results, since more spots may alter the incentives that teams face

[4]The first four of the *Serie B* are promoted to the *Serie A* in the next year

[5]As other tournaments may influence the perception of performance, conditional on the teams planned objective for the year, we test for our results excluding turnovers highly related to elimination events not captured in the data

[6]Daniel thanks Henrique Gomide for making the data available through https://github.com/henriquepgomide/caRtola

match observations.

Since the fantasy game rely on players real scouts to attribute (or take) points into the system, we have a rich source of each team's player performance in a given match. Specifically, we have data on goals scored, passes, assist, fouls suffered (or committed), yellow and red cards, takes and saves (only for goalkeepers). With this data, we could construct a panel for all players in each of the 20 brazilian clubs in *Serie A* through every season (time is given by round in each year).

However, despite being able to construct a panel at the player-match level, this version of the paper rely on a match level panel. Since, in a given season j, every team i has only one headcoach in charge in a round t, we aggregate scouts at the match level data to disentangle the effects of headcoach turnover upon team's performance. Table 1 presents summary statistics for the variables of interest. Column (1) presents for all teams, column (2) presents for the teams that less than two turnovers in the season (median value of Panel A) and column (3) for teams that had at least two turnovers. We can notice that teams that replace the head coach more than the median value usually score 10 points less during the season, are more likely to be in lower quantiles of positions (closer to relegation zone), spend an average of 28,7% of their time in a given season inside the relegation zone (last quantile), have a smaller share of victories, higher share of defeats and score (suffer) less (more) goals. We reject all these differences at the 1% level in columns (4). Therefore, we can conclude that the decision to sack the coach is highly correlated to the outcomes of interest.

We will approach this selection into turnover by exploiting teams that are in similar quantiles in the tournament. We interpret this as, conditional on team and season characteristics, that these club's board members will be facing similar incentives. Including fixed effects by position quantile on the two-tailed test for the equal-

Table 1: Summary Statistics

	(1) All Teams	(2) < 2 Quits	(3) ≥ 2 Quits	(4) p-value	(5) $p^{quintile}$
Total Points	52.075	58.385	47.250	0.000	0.311
	(12.834)	(10.978)	(12.095)		
Number of Quits	1.600	0.538	2.412	0.000	0.000
	(1.111)	(0.503)	(0.674)		
Quantile of Points	3.000	3.590	2.549	0.000	1.000
	(1.172)	(1.046)	(1.064)		
Share of Round in Relegation Zone	0.200	0.086	0.287	0.000	0.870
	(0.281)	(0.166)	(0.319)		
Share of Victories	0.371	0.427	0.328	0.000	0.334
	(0.116)	(0.102)	(0.109)		
Share of Defeats	0.371	0.317	0.412	0.000	0.395
	(0.115)	(0.098)	(0.112)		
Share of Draws	0.258	0.255	0.260	0.644	0.918
	(0.058)	(0.060)	(0.057)		
Mean Goals Scored	1.162	1.291	1.063	0.000	0.292
	(0.298)	(0.260)	(0.289)		
Mean Goals Suffered	1.162	1.073	1.229	0.000	0.621
	(0.237)	(0.208)	(0.237)		
Teams per Season	120	52	68		

Notes: (4) and (5) present p-values from two-tailed test for the equality of means. (5) include average quantile of a club in the season as control.

ity of means above lead us to not reject the null hypothesis for the variables, with the exception for the number of quits (see column (5) in Table 1). Therefore, we gain more confidence in our empirical strategy described in the next section.

3 Empirical Strategy

Our empirical strategy relies on within-team-season variation to identify the effects of turnover. Let i index team, j index season and t index round. Equation (1) employ a two-way fixed effects model to investigate turnover impacts immediately after succession, where η_i, η_j and η_{ij} are team, season and team-season fixed effects, respectively. We cluster standard errors by team.

$$y_{ijt} = \beta_1 Turnover_{ijt} + \eta_i + \eta_j + \eta_{ij} + \varepsilon_{ijt} \tag{1}$$

y_{ijt} are the outcomes analysed: binary variable if either the team i won, draw or lost on round t of season j; counting variable for the number of goals scored or suffered. Equation (2) employ an event-study design with the same set of fixed effects and rely on the same source of variation to identify pre-trends and the effect over time. τ indicates round before or after turnover occured. Therefore, we can interpret the variables included as leads and lags of the turnover ($\tau = 1$ indicates first round under new coach and $\tau = -1$ indicate last round under the sacked one). Importantly, the null hypothesis $\mathcal{H}_0 : \beta_{-6} = \beta_{-5} = \beta_{-4} = \beta_{-3} = \beta_{-2} = \beta_{-1} = 0$ is not likely to hold only conditional on team, season and team-season fixed effects. Through descriptive evidence we have already shown that team's that replace the coach are also the ones poorly performing (see column (3) Table 1).

$$y_{ijt} = \sum_{\substack{\tau=-6 \\ \tau \neq 0}}^{6} \beta_1^{\tau} Turnover_{ijt}^{\tau} + \eta_i + \eta_j + \eta_{ij} + \varepsilon_{ijt} \tag{2}$$

Callaway & Sant'Anna (2018) combine regression and propensity score to deal

with the case in which the pre-trend assumption only holds after conditioning on covariates. We approach this issue later using this estimator, but for this version we employ more naive methods. First, equation (3) include a variable that we know to be endogenous to previous performance and that captures the incentives facing board member's deciding to sack the coach or not: a team's quintile in the championship table. We choose quintile since it matches the feature of incentives in the brazilian championship, since the first quintile ($20^{th} to 17^{th}$) are relegated and the last quintile (first four) goes to the most important continental tournament (*Libertadores*). With this, we hope to address these different pre-trends or selection into the treatment (Heckman & Smith, 1999). We also shown in Table 1 that accounting for quintile significantly reduces selection in our sample. Therefore, equation (3) below is more likely to deliver causal estimates of turnover effects over time.

$$y_{ijt} = \sum_{\substack{\tau=-6 \\ \tau \neq 0}}^{6} \beta_1^{\tau} Turnover_{ijt}^{\tau} + \sum_{\omega=1}^{5} \theta_{ijt}^{\omega} + \eta_i + \eta_j + \eta_{ij} + \varepsilon_{ijt} \tag{3}$$

θ_{ijt}^{ω} is a factor variable that indicates if in season j, team i is in the ω quintile on round t. ω goes from 1 (last four, which is also called relegation zone) to 5 (first four, important intercontinental zone). Equation (4) interacts this indicator of quintile with the event-study around turnover. Once doing this, our comparison of turnover effects rely on teams within the same quintile, which represents an attempt to control for the endogeneity into turnover decisions. Results show that this attempt result in much more reasonable pre-trends than before.

$$y_{ijt} = \sum_{\substack{\tau=-6 \\ \tau \neq 0}}^{6} \sum_{\omega=1}^{5} \beta_1^{\tau} Turnover_{ijt}^{\tau} \times \theta_{ijt}^{\omega} + \eta_i + \eta_j + \eta_{ij} + \varepsilon_{ijt} \tag{4}$$

Later versions of the paper will use equation (5) to specify the match on observables through propensity score matching techniques to test the robustness of equations (3) and (4). Under the assumptions of PS, this would allow us also to control for unobservables that could be correlated with the decision to sack the coach. Later versions will also build on this using Callaway and Sant'Anna (2018) estimator.

$$P(Turnover_{ijt}) = \Phi\left(\sum_{\tau=-6}^{-1} \rho^{\tau} y_{ijt}^{\tau} + \gamma X_{ij} + \sum_{\omega=1}^{5} \theta_{ijt}^{\omega}\right) \tag{5}$$

Equation (5) includes lagged outcomes as well as team characteristics that can influence the decision of whether to replace the head or not. We also include club's quintile, such as we did in equation (3) and (4). If correctly specificed, using the predicted turnover to control for selection bias would deliver causal effects. This should not deliver very different results than equation (3) and (4) if we include the same vector of controls.

4 Results

We start to discuss our results by focusing our attention in the immediate effects of turnover in Table 2. By immediate effects we mean that we restrict our attention to the very first after the headcoach turnover. Column (1) present naive OLS estimates in which we can reject the null hypothesis at the 1% in most of the cases. The inclusion of team and year fixed effects do not seem to change the magnitude of the estimates in a considerable manner in columns (2) and (3). However, the inclusion of the team-season (two way fixed effects) in column (4) seem to reduce the magnitude of most estimates, which suggest the presence of some bias without relying on within team-season variation in turnover. Column (5) add quintile fixed effects, which should control for some of the selection into turnover via the incentives faced by board members in a given part of the table.

The estimates suggest that the decrease in the probability of winning reduces by a large amount and loses some of its significance, indicating that the detrimental effects seen in columns (1) to (4) are not that large. The increase in the probability of winning by changing the coach is also reduced, as is the number of goals suffered. Interestingly, if teams that change the coach seemed to scored less goals after turnover, the absence of impacts on column (5) panel D suggest that the detrimental effect is not large neither significant at conventional levels. We should keep in mind that Table 2 deliver estimates of immediate effects of headcoach turnover. It may be the case that the change show dynamic effects over time.

Figures 1 and 2 present results for the event study described in equation (2), which is an expansion of column (4) of Table 2 to an event study design. It is clear in these figures that, despite relying on within team-season variation, teams that replace the coach are win less (Figure 1a), lose more (Figure 1b), suffer more (Figure 2d) and score less (Figure 2c) goals before changing the head coach. Moreover, the

Table 2: Equation 1 - Immediate Effects

	(1)	(2)	(3)	(4)	(5)
Panel A. *Probability of Winning*					
Turnover	-0.159***	-0.143***	-0.143***	-0.123***	-0.058*
	(0.030)	(0.030)	(0.030)	(0.029)	(0.031)
Mean Dep. Var	0.371	0.371	0.371	0.371	0.371
R^2	0.004	0.037	0.037	0.061	0.114
N	4440	4440	4440	4440	4438
Panel B. *Probability of Draw*					
Turnover	-0.057*	-0.058*	-0.058*	-0.060*	-0.065**
	(0.030)	(0.030)	(0.030)	(0.030)	(0.031)
Mean Dep. Var	0.258	0.258	0.258	0.258	0.258
R^2	0.001	0.006	0.008	0.019	0.022
N	4440	4440	4440	4440	4438
Panel C. *Probability of Losing*					
Turnover	0.217***	0.201***	0.202***	0.184***	0.123***
	(0.038)	(0.037)	(0.037)	(0.036)	(0.040)
Mean Dep. Var	0.371	0.371	0.371	0.371	0.371
R^2	0.008	0.037	0.037	0.062	0.108
N	4440	4440	4440	4440	4438
Panel D. *Number of Goals Scored*					
Turnover	-0.248***	-0.215***	-0.217***	-0.169**	-0.075
	(0.072)	(0.070)	(0.071)	(0.068)	(0.067)
Mean Dep. Var	1.161	1.161	1.161	1.161	1.161
R^2	0.002	0.039	0.040	0.074	0.097
N	4438	4438	4438	4438	4438
Panel E. *Number of Goals Suffered*					
Turnover	0.427***	0.393***	0.394***	0.371***	0.270***
	(0.076)	(0.076)	(0.076)	(0.077)	(0.079)
Mean Dep. Var	1.161	1.161	1.161	1.161	1.161
R^2	0.006	0.034	0.035	0.053	0.079
N	4438	4438	4438	4438	4438
Team FE		✓	✓	✓	✓
Season FE			✓	✓	✓
Team-Season FE				✓	✓
Quintile FE					✓

Note: Clustered standard errors by team between parentheses. Stars are at the usual significance level (* 10%, ** 5% and *** 1%).

impacts of turnover do not seem to be different than zero right after the change. Therefore, despite stemming the tide of bad results, we cannot rule out that this was simply due to mean reversion and not to the actual effects of turnover.

Figures 3 and 4 present results for equation (3), which adds fixed effects for quintile of position, therefore corresponding to the event study specification of column (5) of Table 2. The figures are qualitative similar to the the ones from equation (2), despite reducing in the magnitude of pre-trends. Figures 5 and 6 expands on this and present the event study effects of turnover by quintile. If the main incentives that board member's face that lead to selection into turnover are related to team's

position on the table, figures 5 and 6 are likely to reduce the bias from our estimates.

In fact, pre-trends present higher estability now and shorter confidence intervals (despite the higher number of estimates for the number of observations reducing our power), which suggest that we are accounting better for the selection. Regarding the probability of winning and losing (Figure 5), teams in lower positions do not seem to show any response to turnover, if anything a reduction in the probability of losing. Teams in higher quintiles however, seem to increase their probability of winning a game. The pattern for goals (Figure 6) is very similar, with teams in the first quintile scoring more after turnover, while none showing significant patterns of decrease in the goals suffered.

5 Conclusion

Our work builds upon the previous empirical literature to answer whether coach turnover does impact a teams performance or not. Relying on match level data from the Brazilian National Football Championship (*Serie A*), we use variation at the team-season level to answer this question. However, despite the previous literature mostly finding negative (Audas, Dobson and Goddard, 2002) or null effects of coach turnover (Bruinshoofd & ter Weel (2003), De Paola & Scoppa (2012)), we take caution in interpreting this results in this way. Estimates from equation (2) and (3) show significant pre-trends, which suggests selection into treatment. In addition, not rejecting the null hypothesis after turnover does not indicate the absence of positive effects. As we can't observe the counterfactual under which teams that replaced the headcoach didn't replace them, its difficult to distinguish between a mean reversion or an actual improvement.

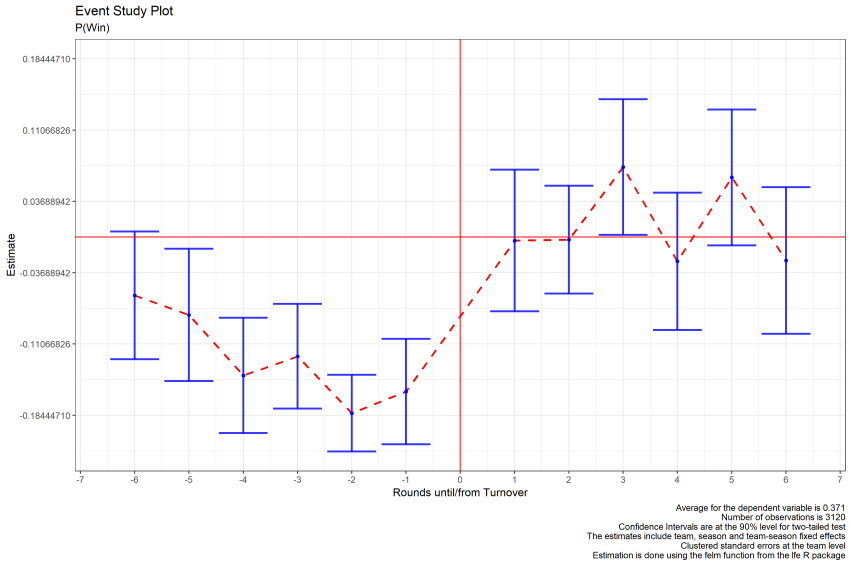
Whatsoever, if we believe in equation (3), after conditioning on a team's quintile, some positive effects seem to be indeed present. From the 6 rounds after turnover we look into, in the two we reject the null hypothesis at the 10% level, the effect seem to be an increase in the probability of winning a game in 30% relative to the mean. Some decrease in the probability of losing a game and in the number of goals suffered also seem to be present. Figures 5 and 6 present an heterogeneity analysis by quintile. Team's that are in the last positions of the table seem to benefit less (or even not at all) than teams at the top. However, it is also more likely that club's at the top of the table are more likely to replace the coach for more exogenous reasons than those at the bottom (for example, they may have suffered an elimination in high visibility playoff tournaments). Later versions of the paper will also try to investigate the causes around turnover and to check the robustness of our estimates.

Furthermore, a proper documentation of turnover is still necessary. Captur-

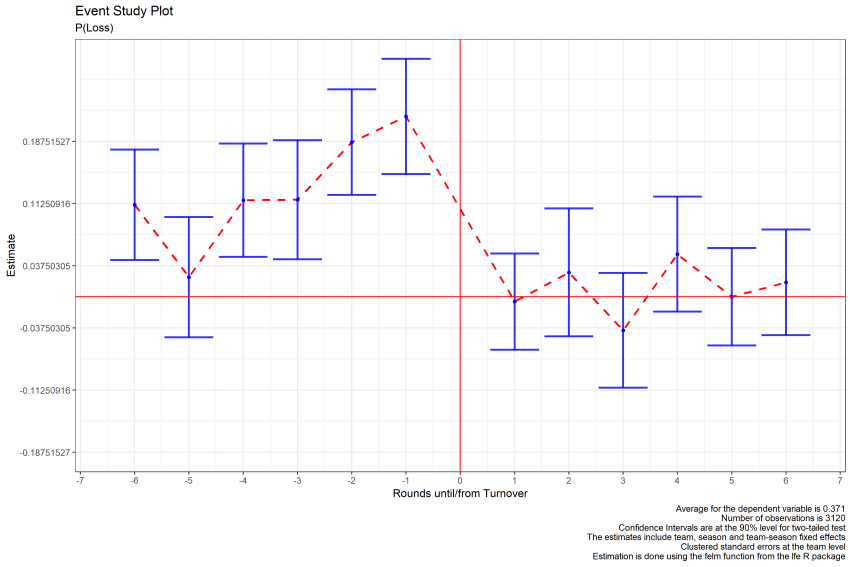
ing the average tenure of the coach through a survival analysis (see Tozetto et al. 2019) and the causes for why the board to sack head coaches seem areas important to further research. We will also tackle selection into treatment by combining regression with propensity score techniques (see Callaway and Sant'Anna, 2018). It is also important to note that, despite the most important outcome being whether the team increase its performance on a given match or not, a proper mechanism analysis would need to look at player-match level data. It is possible that the coach impact team's performance through its tactics, therefore impacting player behavior on pitch. We do not observe player performance in this version of our analysis, but will later introduce this relying on the granular level of detail we have in our data.

6 Figures

Figure 1: Equation 2A - Probability Result

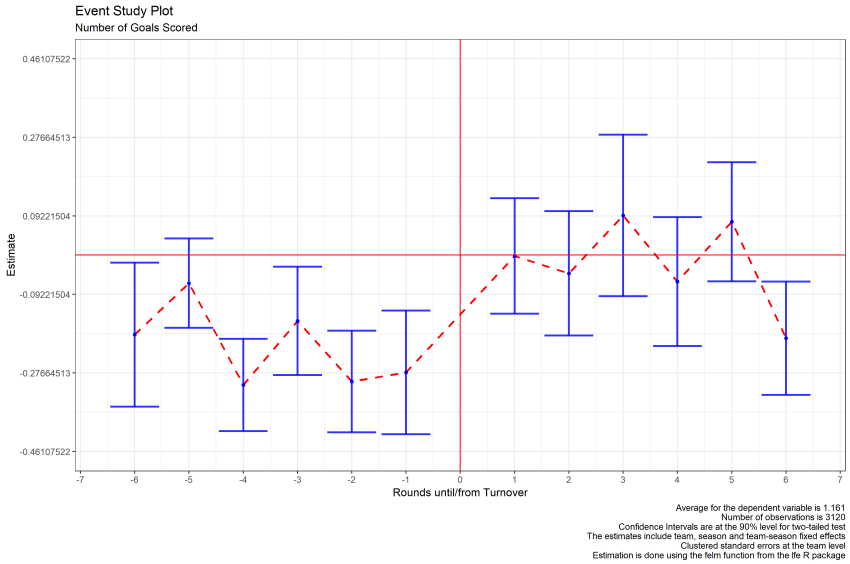


(a) Probability of Winning

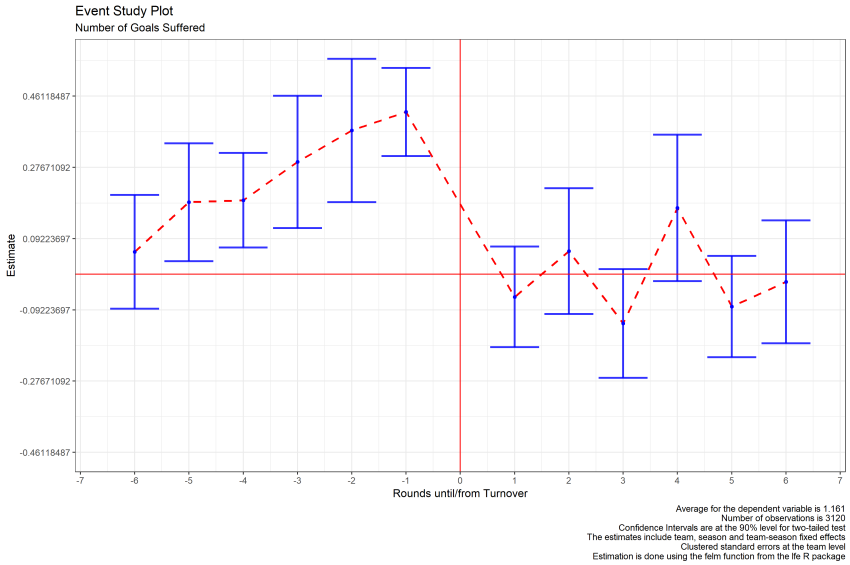


(b) Probability of Losing

Figure 2: Equation 2B - Goals

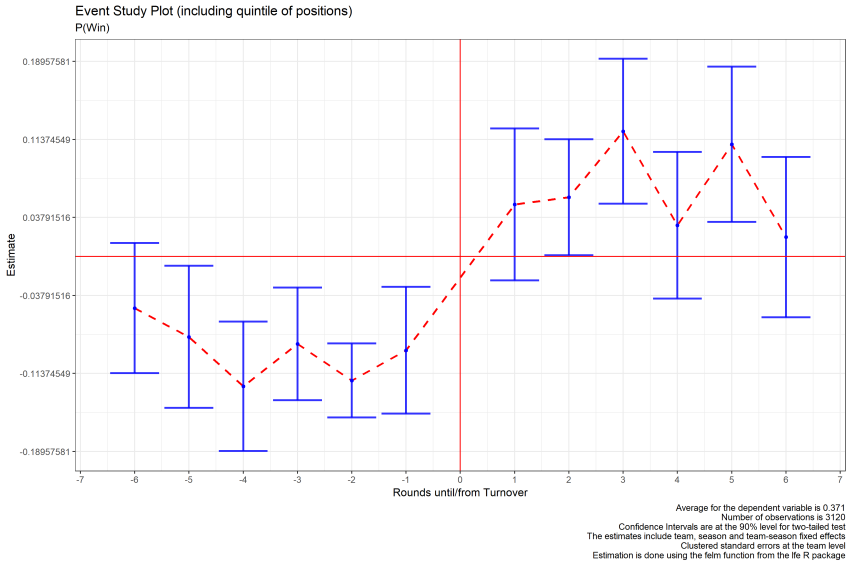


(a) Goals Scored

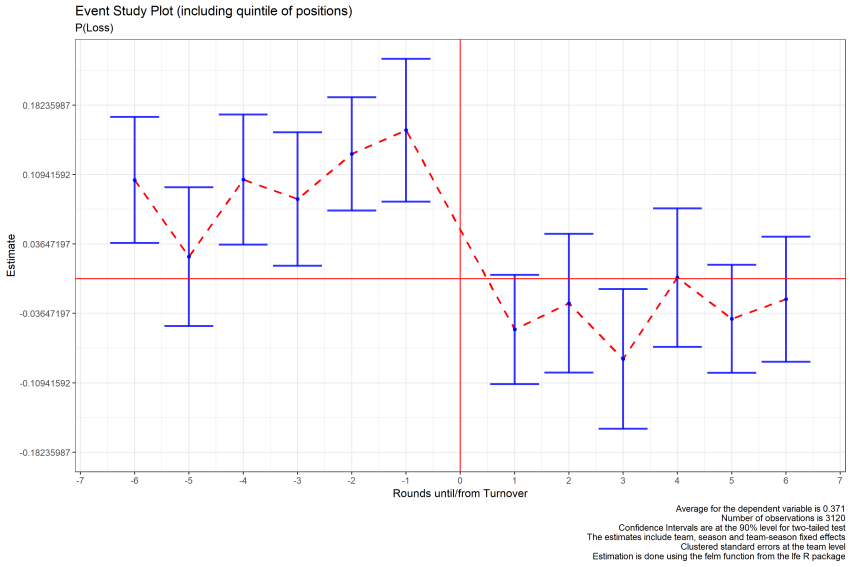


(b) Goals Suffered

Figure 3: Equation 3A - Probability Result

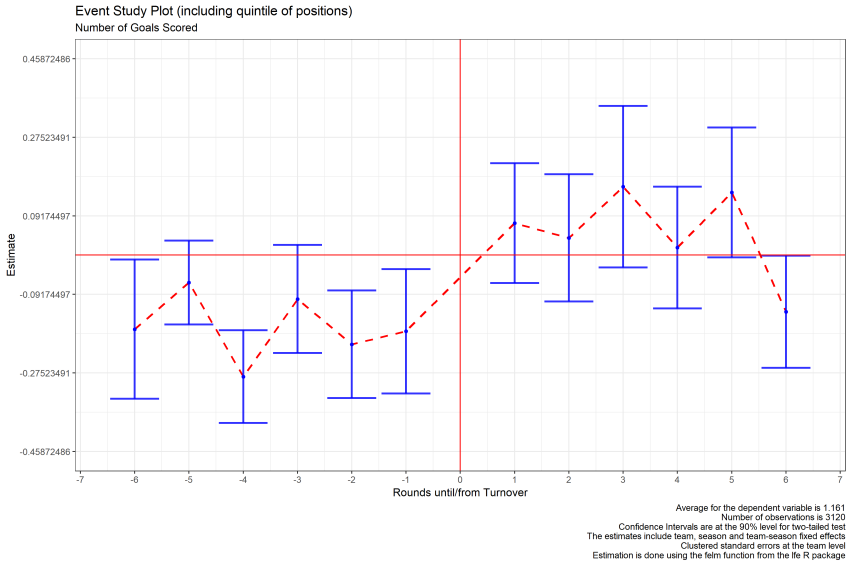


(a) Probability of Winning

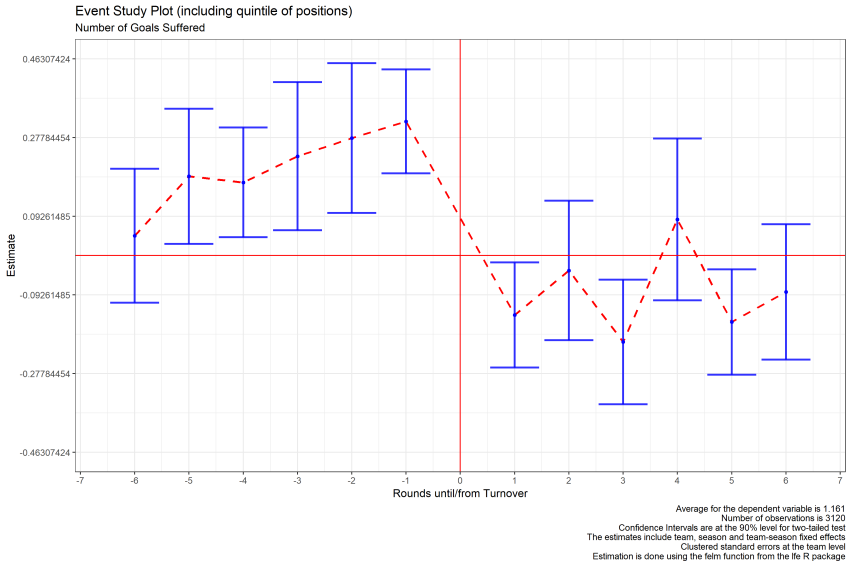


(b) Probability of Losing

Figure 4: Equation 3B - Goals

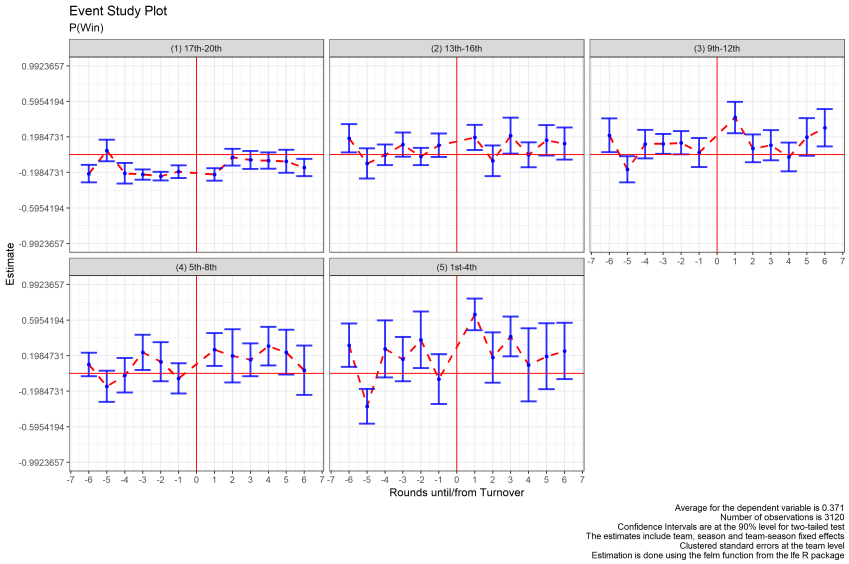


(a) Goals Scored

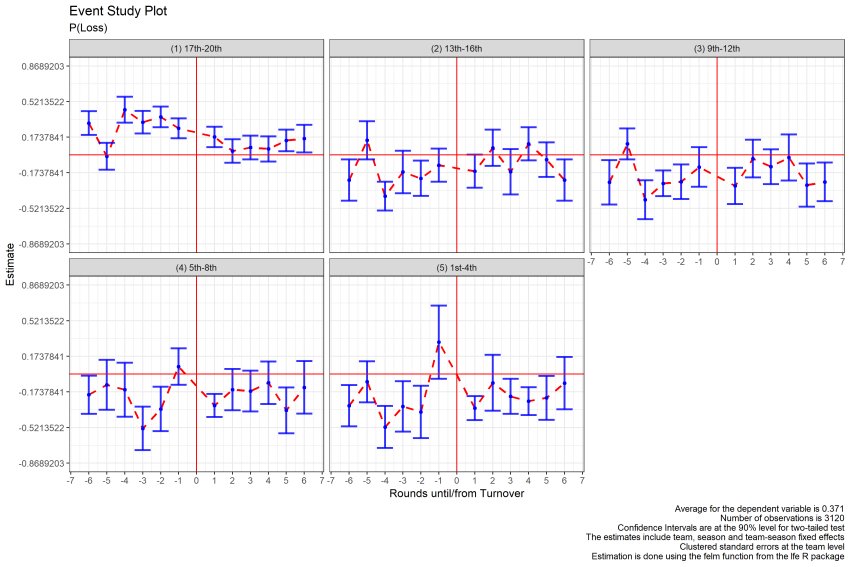


(b) Goals Suffered

Figure 5: Equation 4A - Probability Result (by Quintile)

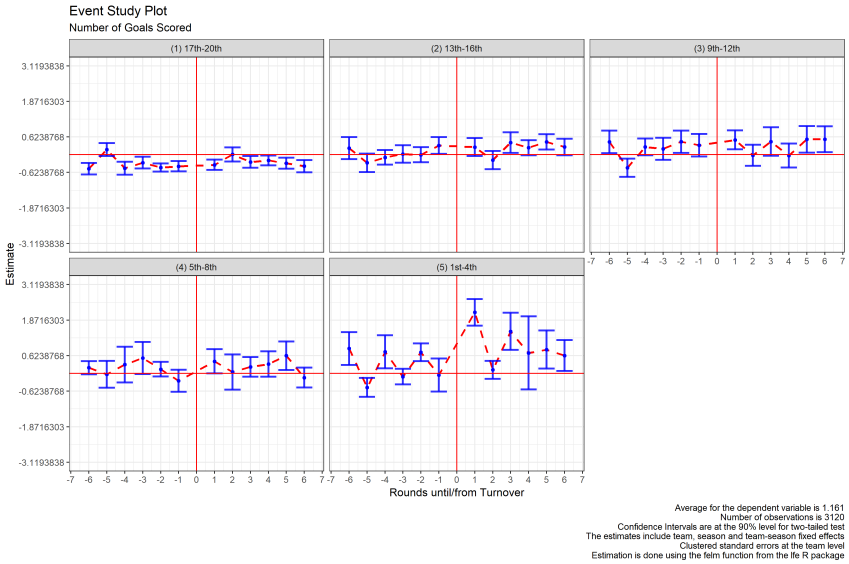


(a) Probability of Winning by Quintile

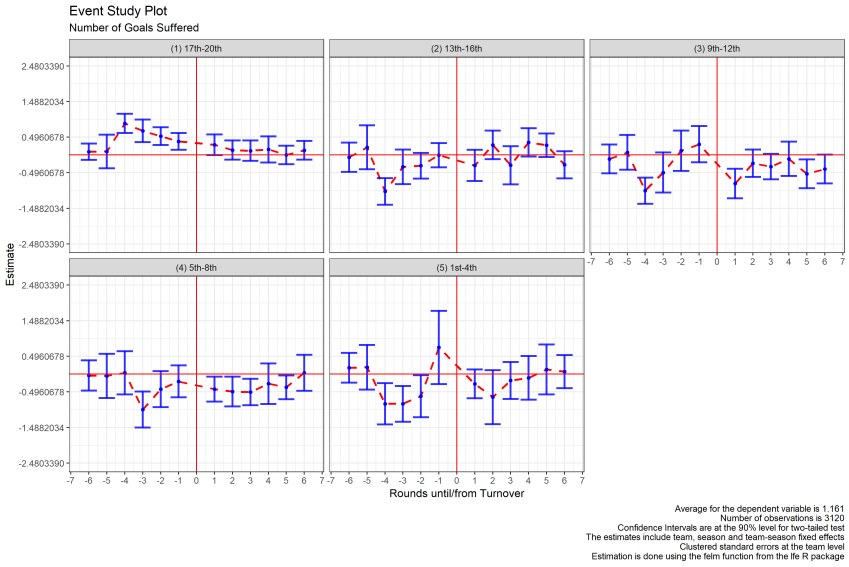


(b) Probability of Losing by Quintile

Figure 6: Equation 4B - Goals (by Quintile)



(a) Goals Scored by Quintile



(b) Goals Suffered by Quintile

7 Bibliography

ASHENFELTER, O. Estimating the effect of training programs on earnings. *The Review of Economics and Statistics, v. 60, n.1, p. 47-57, 1978.*

AUDAS, R; DOBSON, S; GODDARD, J. The impact of managerial change on team performance in professional sports. Elsevier, *Journal of Economics and Business, v. 54, n.6, p.633-650, 2002.*

BRIDGEWATER, S; KAHN, L; GOODALL, A. Substitution and complementarity be-tween managers and subordinates: Evidence from British football. *Elsevier, Labour Economics, v. 18, n. 3, p. 275-286, jun. 2011.*

BRUINSHOOFD, A; TER WEEL, B. Manager to go? Performance dips reconsidered with evidence from Dutch football. *European Journal of Operational Research, v. 148, n. 2, p. 233-246, 2003.*

BRYSON, A.; FRICK, B.; SIMMONS, R. The returns to scarce talent: footedness and player remuneration in European soccer. *Journal of Sports Economics, v. 14, n. 6, p. 606-628, 2013.*

CALLAWAY, B.; SANT'ANNA, P. HC. Difference-in-differences with multiple time periods and an application on the minimum wage and employment. *arXiv preprint arXiv:1803.09015, 2018.*

CARDOSO, G. F. Y. O Impacto dos Treinadores de Futebol sobre o Desempenho dos Clubes Brasileiros. 2015. 33p. *Monografia (Conclusão da Graduação) – Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro*

DE DIOS TENA, J.; FORREST, D. Within-season dismissal of football coaches: Statistical analysis of causes and consequences. *European Journal of Operational Research, v. 181, n. 1, p. 362-373, 2007.*

DEPETRIS-CHAUVIN, E.; DURANTE, R.; CAMPANTE, F. Building nations through shared experiences: Evidence from African football. *American Economic Review, v. 110, n. 5, p. 1572-1602, 2020.*

DIRKS, K. Trust in leadership and team performance: Evidence from NCAA basket-ball. *Journal of applied psychology, v. 85, n. 6, p. 1004, 2000.*

FRICK, B.; SIMMONS, R.. The impact of managerial quality on organizational per-formance: evidence from German soccer. *Managerial and Decision Economics, v. 29, n. 7, p. 593-600, 2008.*

GAMSON, W. A.; SCOTCH, N. A. Scapegoating in baseball. *American Journal of Sociology, v. 70, n. 1, p. 69-72, 1964.*

GOMIDE, H. caRtola. 2019. Disponível em: <https://github.com/henriquepgomide/caRtola>. Acesso em: 02 de Julho de 2020.

GOODALL, A. H.; KAHN, L. M.; OSWALD, A. J. Why do leaders matter? A study of expert knowledge in a superstar setting. *Journal of Economic Behavior Organization, v. 77, n. 3, p. 265-284, 2011.*

GOODALL, A. H. Highly cited leaders and the performance of research universities. *Research Policy, v. 38, n. 7, p. 1079-1092, 2009*

GRUSKY, O. Managerial succession and organizational effectiveness. American *Journal of Sociology, v. 69, n. 1, p. 21-31, 1963.*

HECKMAN, J. J.; SMITH, J. A. The Pre-programme Earnings Dip and the Determi-nants of Participation in a Social Programme. Implications for Simple Programme Evaluation Strategies. *The Economic Journal, v. 109, n. 457, p. 313-348, 1999.*

HÖFFLER, F; SLIWKA, D. Do new brooms sweep clean? When and why dismissing a manager increases the subordinates' performance. *European Economic Re-*

view, v. 47, n. 5, p. 877-890, 2003.

PAOLA, M. D; SCOPPA, V. The effects of managerial turnover: evidence from coach dismissals in Italian soccer teams. *Journal of Sports Economics, v. 13, n. 2, p. 152-168, 2012.*

TOZETTO, A. B., CARVALHO, H. M., ROSA, R. S., MENDES, F. G., SILVA, W. R., NASCIMENTO, J. V., MILISTETD, M. Coach Turnover in Top Professional Brazilian Football Championship: A Multilevel Survival Analysis. *Frontiers in psychology, 10, 1246, 2019*

WILSON, J. Ángeles con caras sucias: La historia definitiva del fútbol argentino. *Corner, 2018.*