# Do Sports Team Managers Matter?

Rob Simmons (Lancaster)
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With massive help from Dave Berri, Alex Bryson, Tunde Buraimo and Bernd Frick

## Outline

- Theme of talk is the managerial labour market in team sports
- More work done in sports economics on players than on managers and coaches
- Emphasis on Head Coach; also emphasise European football but not to complete exclusion of other sports
- **Plan**
- Preliminaries
- **Explaining managerial turnover**
- **Modelling effects of managerial turnover on team performance**
- What to do next

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## What do coaches do?

- Select players
- Motivate/inspire
- Strategy and tactics
- But this depends on the sport: less role for tactics and strategy in MLB and NBA; important in NFL
- Coaching/teaching role (Bridgewater et al on football, 2011; Goodall et al, 2011 on NBA)
- Division of labour: offensive/defensive coordinators in NFL; General Manager in MLB & NFL; Director of Football
- Role of different managerial levels in team performance considered by Goff (2011) and currently Peeters et al.

## Billy Beane & Art Howe: The Moneyball Story

## Moneyball

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- Billy Beane as General Manager was tasked with putting together a winning MLB team on a limited budget
- Art Howe as Manager; frictions between Howe and Beane
- So who was responsible for Oakland A's success in 2002? Beane or Howe or both?
- Beane credited with 'revolutionising' MLB through use of statistical analysis- founder of sports analytics
- But statistics were already there: Bill James
- So perhaps Billy Beane was just a very good GM
- Digression: Howe objected to his portrayal by Philip Seymour Hoffman in the movie, called it 'character assassination'

## Importance of managers?

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- Pep Guardiola: " I'm not an innovator, I'm an ideas thief!"
- Rene Girard, Montpellier. Ligue 1 winners 2011/12, 3 points clear of favourites Paris St. Germain:

"It just goes to show that everyone can beat everyone and that money isn't the be-all and end-all. We're a club of mates, a club that brings young players through and gives them a chance.. We played some great football with a well-balanced team"

- Girard went on to coach Lille and is now at Nantes. Montpellier finished 12$^{th}$ in Ligue 1 2015/16
- Successful managers and coaches add value, raise player productivity
- But success depends on expectations of performance



## Human resource management practices: Ranieri buys pizza for players

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## Managerial efficiency

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- Stochastic frontier and DEA models. Evaluate impacts of managers and coaches on technical efficiency of teams
- Managers not a direct input to team performance, players are. But coaches can alter levels of technical efficiency e.g. 2 step SF model
- Dawson et al, JSE 2000, English Premier League- technical efficiency falling over 1992/93 to 1997/98. Pressure for success and increasing turnover rates.
- Frick and Simmons, MDE, 2008: Bundesliga, bigger teams that pay higher head coach salaries found to be more efficient than smaller teams paying lower salaries
- Del Corral et al JSE forthcoming, Spanish basketball. Foreign coaches more efficient than Spanish nationals in 2 empirical approaches. Ex-players more efficient in SF model
- Kahane RIO 2005, NHL, head coaches who were former players reduce technical inefficiency

## A crazy managerial market?

- William Goldman: "Nobody knows anything...... Not one person in the entire motion picture field knows for a certainty what's going to work. Every time out it's a guess and, if you're lucky, an educated one."
- Does this apply to team sports and to team owners?
- Fans chant to 'bad' managers (and referees): "You don't know what you're doing!"
- Palermo football team: 6 head coaches in 2012/13, got relegated; 8 head coaches in 2015/16, survived in last game of season
- Leeds United, new owner Massimo Cellino (Cagliari President) "the manager eater", 7 head coaches since February 2014

## Davide Ballardini: 12th spell as head coach since 2004, 3rd at Palermo, 3 at Cagliari



## Unstable Italy, stable France? Number of head coaches since 2004

| Italy | | France | |
|---|---|---|---|
| Palermo | 31 | Ajaccio | 13 |
| Cagliari | 27 | Nantes | 13 |
| Lecce | 20 | Marseille | 12 |
| Torino | 18 | Monaco Sochaux | 11 |
| Fiorentina | 9 | Lille St. Etienne Toulouse Caen | 5 |
| Juventus | 9 | Nancy | 4 |
| AC Milan | 9 | Lorient | 2 |
| Napoli | 6 | | |
| Average | 14 | Average | 8 |

## Head coach recycling: May- August 2016

| Club | Arriving | Spells | Departing | Fire/quit |
|---|---|---|---|---|
| Empoli | G. Martuscilleo | 0 (internal) | M. Giampaolo | F |
| Udinese | G. Iachini | 11 | L. De Canio | F |
| Torino | S. Mihajlovic | 6 | G. Ventura (national team) | Q |
| Genoa | I. Juric | 2 | G. P. Gasperini | Q |
| Atalanta | G. P. Gasperini | 6 | E. Reja | F |
| Crotone | D. Nicola | 3 | I. Juric | Q |
| Sampdoria | M. Giampaolo | 9 | V. Montella | Q |
| AC Milan | V. Montella | 3 | S. Mihajlovic | F |
| Lazio | S. Inzaghi (Caretaker) | 1 | S. Pioli | F |
| Internazionale | F. De Boer | 1 | R. Mancini | F |

## Coach recycling

- Coaches are fired very frequently. Less so in France & Germany.
- D'Addona and Kind, JSE 2014- coach durations falling in English football league in post-war period; probability of firing has gone up
- Could reflect greater rewards and greater cost of failure (relegation)
- If a coach is fired then this does not necessarily imply stigma
- Pool of fired coaches, often on 'gardening leave' available to be hired somewhere else.
- Italian rule: coach fired by team A can't be hired by team B in same season but can return to team A (similar in Germany but not in England)
- Why not hire a rookie coach? Promote from within?
- Assistants may not make good head coaches; may be tainted with head coach failure

## Tervio: Market for mediocre talent

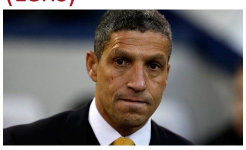
- Industry-specific talent that can only be revealed on the job
- So they go to external market and bid excessively for the pool of incumbent managers at expense of trying out new talent
- Which is populated by fired managers who failed somewhere
- So market for mediocre managers is sustained- unfavourable selection of managers
- See Thomas Peeters presentation tomorrow
- But not everyone in pool of vacancies is mediocre
- Rafa Benitez: Real Madrid to Newcastle?
- Roberto di Matteo: Chelsea to Schalke 04 to Aston Villa
- But these coaches won Champions League! Now in English Championship. So are they mediocre?
- Didn't want to be out of work 'too long'- scarring effect of unemployment eventually



## Head coach profile

- Must have UEFA coaching badge
- White- very few black head coaches; Rooney rule for European football?
- Male- 1 female head coach, Corinne Dacre at Clermont Foot
- Ex-player but not necessarily international, need not have played for team now coaching for- exception: Jose Mourinho
- Age 40-60
- Has managerial experience
- Most likely same nationality as league, though not true for EPL where 7/20 head coaches are British

## Black head coaches: Chris Hughton (Brighton) & Antoine Kombouare (Lens)



## Literature on Head Coach Survival

- Barros, Frick & Prinz, AE, 2009: Bundesliga- hazard model
- Bachan, Reilly & Witt, JORS 2008, English Football League, 3 seasons- also use a hazard model
- Goddard (2014), English football
- Pieper, Nuesch & Franck, SBR, 2014: Bundesliga, uses expected points via betting odds
- Van Ours & Van Tuijl, EI, 2016: Dutch top division, 14 seasons
- Most literature uses logit or LPM; highlights role of recent performance in firings; can put this in terms of 'surprise', points – expected points.

## Bryson/Buraimo/Simmons (1) Hypotheses

- Increased performance (absolutely and above expectations) reduces likelihood of dismissal and increases likelihood of quitting
- General human capital (e.g. experience) is valued by team owners protecting coaches from dismissal even if performance is poor. Greater human capital raises quit rates. Greater age raises dismissal probability given experience (reduced match-specific surplus; burn-out; salary).
- More firm-specific human capital lowers dismissal probability without affecting quit probability (reduced information asymmetry; learning)
- Playing experience does not affect dismissal or quit probability, contrary to Goodall et al. (2011) on NBA
- Dismissal probabilities are greater in top tier than second tier; greater for Spain and Italy ('trigger-happy owners' linked to governance structures)



## Data

- 4 countries 2000/01 to 2014/15; France, Germany, Italy and Spain
- Similar management structures: Head coach + Director of football
- 8 divisions in total so 218 teams
- Larger data set than previous studies covering 638 coaches with 68,172 coach-game observations, 1,518 of which end in departure from the club
- Distinguish voluntary quits from firings (mutual consent & non-renewal of contract = firing; source = Wikipedia + newspaper reports);
- Team and manager covariates: account for firm-specific human capital
- Cumulative surprise: actual points – expected points derived from betting odds; expected points = 3*win prob + 1*draw prob

## Cox Proportional Hazard Results

| Variable | All | Fires | Quits |
|---|---|---|---|
| **Team:** Position last season | -0.005 | -0.002 | -0.011 |
| Team promoted | 0.634*** | 0.397 | 0.742*** |
| Team relegated | 0.690*** | 0.992*** | 0.141 |
| **General Human Capital**: Age | 0.015*** | 0.022*** | -0.004 |
| Year of first job | 0.008 | 0.018*** | -0.018*** |
| N previous spells | -0.001 | 0.024 | -0.060*** |
| Got team promoted | -0.182*** | -0.218*** | -0.035 |
| Got team relegated | -0.154** | -0.052 | -0.489*** |
| Cup win | -0.159* | -0.348*** | 0.226 |
| Title win | -0.089 | -0.090 | -0.041 |
| Working in home country | -0.222*** | -0.268*** | -0.117 |

## Cox Proportional Hazard Results

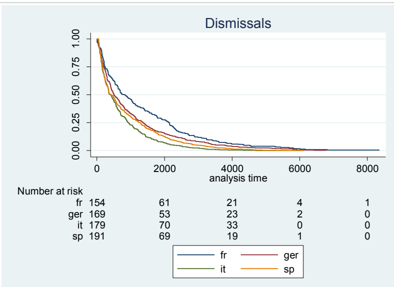
| Variable | All | Fires | Quits |
|---|---|---|---|
| **Firm-specific human capital** | | | |
| Ex-player with club | -0.056 | -0.055 | -0.056 |
| N previous spells with club | -0.184*** | -0.291*** | 0.047 |
| Hired from within | 0.015*** | 0.022*** | -0.004 |
| **Playing experience** | | | |
| Played for country | -0.041 | -0.067 | -0.013 |
| Years playing experience | 0.015* | 0.021* | -0.001 |
| Played in top league | -0.091 | -0.085 | -0.055 |
| Cup win | -0.159* | -0.348*** | 0.226 |
| Never a professional player | -0.089 | -0.090 | -0.041 |
| Working in home country | 0.329*** | 0.411*** | 0.120 |

## League and time-varying covariates

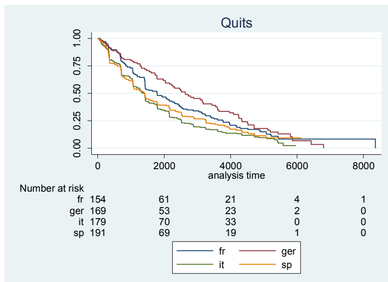
| Variable | All | Fire | Quit |
|---|---|---|---|
| **League** Germany | 0.060 | 0.154 | -0.129 |
| Italy | 0.517*** | 0.561*** | 0.342 |
| Spain | 0.389*** | 0.452*** | 0.274 |
| 2nd tier | 0.051 | 0.057 | -0.038 |
| **Time-varying covariates** | | | |
| Points/game | -0.0004*** | -0.0004*** | -0.0001 |
| Games left this season | -0.0004*** | -0.0004*** | -0.0004*** |
| Last day of season | 0.001*** | 0.001*** | 0.002*** |
| Cumulative surprise | -0.0004*** | -0.0004*** | -0.0001 |
| Pseudo R2 | 0.155 | 0.120 | 0.308 |
| N managers | 638 | 638 | 638 |
| N games | 68,172 | 68,172 | 68,172 |



## Dismissals by country




## Quits by country



## Previous literature on effects of head coach turnover

- **Short-run within season: ordered probit**- papers generally suggest little or no effect or even adverse effect (Audas et al, 2006, NHL). Forrest & Tena (2007) find a positive effect for home games following dismissal for 3 seasons in Spain.
- Problem here is *Ashenfelter Dip*- what would have happened to a team that had poor performances but did not fire its manager? Counterfactual problem with regression to the mean. Expect performances to improve.
- **Short-run within season effects: matching-** some papers suggest zero effect, e.g. Van Ours & Van Tuijl (2016), ter Weel (2011) on Dutch league, De Paolo & Scoppa (2012) on Italy Serie A, also Goddard (2014) on England. **An exception is Madum (2016) for Denmark, positive effects following a coach change.**
- **Fixed effects models-** Cf. Bertrand & Schoar (2003) on CEOs. Hentschel et al (2014) on Bundesliga, manager Fes significant; Berri et al (2009) on NBA- coach/manager fixed effects were significant but differences in effects not great.
- **Manager characteristics**- Goodall et al (2011), NBA, coach playing experience important for team success after controlling for team payroll (considered endogenous) and team fixed effects.

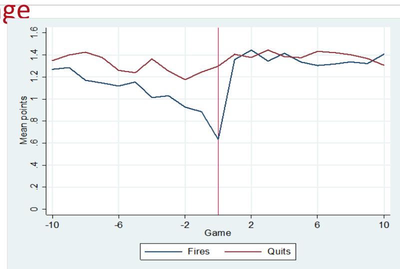
## Bryson, Buraimo & Simmons (2): Multi-league study of head coach turnover

Difference in-difference estimation

1. We create two distinct sets of game sequences. The first set is every sequence of 21 games (games -10, -9, -8, ..., 8, 9, 10) comprising a managerial change (fire or quit). The managerial change occurs at game 0, therefore, games -10 to 0 is for the incumbent manager whilst games 1 to 10 is for the new manager. This first set of sequences is the treatment group. The second set is every sequence of 21 games in which there has been no managerial change. This second set of game sequences is the control group. Note that Palermo-type experience is therefore ruled out.
2. There are 1,185 game sequences involving the treatment group in which there is a managerial change (792 for fires and 383 for quits).
3. Across the two sets of game sequences, games 1 to 10 are the post-period following a managerial change. For the set of games sequences for the control group in which there is no managerial change, a synthetic change is assumed.
4. The difference in difference estimator is therefore Treatment x Post change. Regress points per game over 4 and 10 post-change games with controls.



## Average raw team performance before and after head coach change




## Covariates

- Team points t
- Team points t-1
- Cumulative points t-2 to t-5
- Cumulative points t-6 to t-10
- League position t
- League position s -1
- Games left
- Last game of season

All coefficients significant except for Games left.

## Comments

- Model is similar to Madum (2016)
- t = last game before coach departure; s = season
- Fewer points means greater probability of fire and quit with smaller effect on quit
- Worse league position now means greater probability of fire and quit
- Some quits are 'jump before getting pushed'
- Better league position at end of previous season means higher probability of being fired and quitting- coach finds it difficult to sustain earlier team performance (cf. Mourinho at Chelsea)
- Can replace Points with Surprise (Actual Points – Expected Points) and Cumulative Surprise; get similar results

## Propensity Score Matching

- Find treatment group (games surrounding coach departure, T) and a control group (games not surrounding a coach departure, C)
- Assume all relevant differences between the groups pre-treatment can be captured by observable characteristics
- Establish common support between T and C; assume Conditional Independence. For matching to be valid we need to observe games in treatment and control groups with same range of characteristics

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## Propensity Score Matching

- In order to recover the average treatment-on-the-treated (ATT) effect of coach change we use the estimated propensity scores to identify those treated cases for whom there is common support in the untreated (control group) sample.
- pstest to show 'closeness' of covariates as between treated & control groups, unmatched vs matched- tests for common support
- Select from non-treated pool of games a control group where distribution of observed variables is similar as possible to distribution in treated group
- Calculate propensity score from probability of a game being in treatment group given game characteristics- probit model
- Match on basis of nearest neighbour; kernel method to estimate propensity scores didn't work. 5 neighbours gives more precision in estimates than 1.

## Probit model of coach change

| Variable | All | Fired | Quit |
|---|---|---|---|
| Team points t | -0.220 (17.84) | -0.261 (2.61) | -0.050 (2.70) |
| Team points t-1 | -0.135 (12.05) | -0.150 (12.03) | -0.052 (2.81) |
| Cumulative points t-2 to t-5 | -0.086 (15.79) | -0.090 (15.03) | -0.045 (4.85) |
| Cumulative points t-6 to t-10 | -0.026 (5.61) | -0.031 (6.24) | -0.004 (0.51) |
| League position t | 0.019 (9.39) | 0.022 (9.77) | 0.008 (2.02) |
| League position s -1 | -0.016 (7.72) | -0.016 (7.13) | -0.010 (2.78) |
| Games left | -0.001 (0.93) | -0.0008 (0.58) | -0.007 (2.46) |
| Last game of season | 2.131 (46.38) | 1.543 (29.73) | 2.023 (29.25) |
| Pseudo R2 | 0.282 | 0.204 | 0.394 |

## Regression models

- Dependent variable is points per game over next N games (N = 4, 10)
- Control variables are points per game before change, points in last 10 games, league position before change, league position at end of previous season, number of games left in season, season dummies)
- Models with and without team fixed effects
- Difference-in-difference model
- **Treatment**
- **Post-change**
- **Treatment*Post Change**

## Treatment and Control Groups

- The counterfactual sequence of 10 games is necessarily a single coach/team match
- But it could be different team to treated case
- This is where we depart from van Ours & van Tuijl (2016): they impose requirement that control group comprises same team in different season
- They also only considered within-season turnover. We allow game sequences to straddle seasons so we include between-season turnover
- But of course our counterfactual sequence will be same team when run with team FE



## Coach effects comparison: 4 games after

| | Unmatched | Nearest neighbour (1) | Nearest neighbour (5) | ebalance |
|---|---|---|---|---|
| All | 0.279*** | 0.185*** | 0.252*** | 0.070*** |
| All with team FEs | 0.273*** | 0.139*** | 0.256*** | 0.048*** |
| Fires | 0.338*** | 0.438*** | 0.262*** | 0.088*** |
| Fires with team FEs | 0.330*** | 0.381*** | 0.242*** | 0.056*** |
| Quits | 0.147*** | -0.133 | -0.051 | 0.000 |
| Quits with team FEs | 0.145*** | 0.163 | -0.157 | -0.005 |

## New method: Entropy Balancing

- ebalance in Stata- user-written routine
- Imposes balancing on covariates as between treatment and control groups using mean, variance and skewness not just mean as in PSM
- Algorithm ensures balanced distributions of covariates without ad hoc choice of functions
- Quick to compute
- Interpretation of PS tests is judgemental

## Coach effects comparison: 10 games after

| | Unmatched | Nearest neighbour (1) | Nearest neighbour (5) |
|---|---|---|---|
| All | 0.219*** | 0.219*** | 0.236*** |
| All with team FEs | 0.212*** | 0.136*** | 0.241*** |
| Fires | 0.275*** | 0.208*** | 0.271*** |
| Fires with team FEs | 0.266*** | 0.210*** | 0.266*** |
| Quits | 0.095*** | 0.139 | 0.220 |
| Quits with team FEs | 0.093*** | 0.141 | 0.422 |

## Economic effects

- Change in head coach following a firing leads to 0.2 to 0.4 points per game over 4 games, 0.2 to 0.3 points per game over 10 games from a mean of 1.2 points per game
- Could make the difference between staying in a division and getting relegated
- Obviously depends on the right candidate being available
- Sam Allardyce saved Sunderland; Rafa Benitez didn't save Newcastle
- Smaller effect with entropy balance: 0.07 points/game over 4 games

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## Interpretation

- For fires we find that team performance improves in next 4 or 10 games following a coach change relative to our synthetic counterfactual
- This result is robust to different PSM estimations also to entropy balance
- For quits we find no change in team performance in next 4 or 10 games relative to counterfactual. Important to separate fires from quits.
- So managerial labour market does not look as irrational or inefficient as some commentators suggest
- Though we have ruled out team-seasons with high-frequency changes
- Why? Possibly our large sample size enable the data 'to speak'
- We allow games to roll over across seasons
- Different methods used here
- So next stage is to break sample down by league and see how results stand up

## Conclusions

- Head coach turnover is affected by both specific and general human capital
- Different determinants of fires and quits
- Differences across leagues
- Evidence that firing a head coach can generate improved performance for a team- unless you are Cagliari or Palermo
- Assortative matching among head coaches? E.g. Antonio Conte, Siena to Juventus to Chelsea; Allegri started at Cagliari; Mourinho at Porto
- Lots of work to do, especially on coach heterogeneity, roles of team owners, director of football, playing resources?
- Some interesting papers at this conference: Thomas Peeters tomorrow, Friday afternoon session on Coaches