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ARTICLE

Does Midseason Change of Coach Improve Team Performance? Evidence From the NBA

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One of the most important management dilemmas for owners and general managers of sports teams is whether to make a midseason coaching change when the team is faltering. Changing a coach midseason is an important managerial decision and, like most decisions, there are benefits and costs. The costs are short-term financial costs to owners. If a coaching change is made, owners must compensate the dismissed coach *and* the newly-hired coach. For example, the Detroit Pistons paid about $6 million dollars to Larry Brown in 2005 after firing him (http://www.highbeam.com/doc/1P2-13896726.html). In 2008, Kings paid three head coaching salaries that season to Kenny Natt, Reggie Theus and Bill Musselman (http://nbcsports.msnbc.com/id/28239643). The expected benefit of a midseason coaching change exists in the form of improved team performance. However, there is no theoretical consensus about whether a coaching change improves team performance and empirical work on the subject has been inconclusive.

The goal of this paper is to add to the empirical literature on the performance effects of midseason coaching changes by examining data from the NBA. We develop a simple model to compare the performance of former coaches to current coaches. We use an extensive data set including all midseason coaching changes in the history of the NBA. And finally, we identify factors correlated with making a successful midseason coaching change which should provide useful guidelines for sport managers. Not surprisingly, in some instances a new coach improves team performance and in some cases a new coach negatively affects team performance. However, we find that the new coach has a higher winning percentage in about sixty-one percent of the coaching changes examined. Our empirical results indicate that a new coach is more likely to improve performance if the coach spent time in the NBA as a player, but the new coach is less likely to improve performance the greater the difference in number of games coached by the former and current coaches.

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Coaching Changes and Performance

There is no theoretical or empirical consensus on the effect of midseason coaching changes on performance. Frick, Pestana and Prinz (2010) discuss three theories of CEO or head coach turnover (see also Fizel & D'itri, 1999 and Soebbing & Washington, 2011). These theories are called the *common sense theory*, the *vicious circle theory*, and the *ritual scapegoating theory*. *Common sense theory* predicts that a new CEO or a new head coach is hired if the candidate has the required expertise and experience to increase the performance of the firm/team by stopping the organizational inertia. On the other hand, *vicious circle theory* predicts that the successor is likely to have a disruptive effect on the team resulting in a decline in performance. Finally, *ritual scapegoating theory* predicts no relationship between succession and performance, and that succession events serve only as signals to stakeholders that required organizational change is under way. These theories provide contradictory predictions about the impact of a coaching change on performance.

The empirical results on the effect of midseason coaching changes on performance have been similarly inconclusive. Numerous studies have investigated the coaching change effect in football/soccer (see 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). Few studies have examined the issue for sports other than football/soccer but the exceptions are: American football (Brown, 1982; McTeer, White & Persad, 1995), baseball (Gamson & Scotch, 1964; McTeer, White & Persad, 1995; Scully, 1995), hockey (McTeer, White & Persad, 1995) and basketball

(Fizel & D'Itri, 1999; Giambatista, 2004; McTeer, White & Persad, 1995; Scully, 1995). Results of these studies are contradictory. The only studies to find that midseason coaching changes improve performance are those of Scully (1995), González-Gómez, Picazo-Tadeo & García-Rubio (2011), Van Dalen (1994), Fabianic (1984), and Wagner (2010). Other studies find no effect or a negative effect. Neither theory nor empirical evidence provides a clear answer as to whether a midseason coaching change improves team performance. We seek to add more empirical evidence to the discussion.

Empirical Model

Data for this study come from www.basketball-reference.com, the major source of basketball data available. We collected information on all midseason coaching changes from the first NBA season (1949–50) to 2009–10. For each midseason coaching change, we obtained information on several variables including the previous coaching experience of the new coach. We have information on the number of previous games coached (*TotalBefore*) and the number of previous games won as a coach (*WinsBefore*). These variables measure the experience and expertise of the new coach. We use the ratio of these two variables as another measure of coaching experience that is the fraction of previous games won by the new coach (*PctWinsBefore = Winsbefore / TotalBefore*). For coaches with no prior coaching experience, that is *TotalBefore* = 0, we set *PctWinsBefore* equal to zero. In addition to these coaching performance measures, we have information on previous experience as an NBA Player, measured by total minutes played (*MinutesPlayed*). We also have information on the difference between the percentage of games a team played before and after the coaching change (*Split*).

This information has been used in prior studies of coaching effectiveness. For example, Salomo, Teichmann and Albrechts (2000), and Giambatista (2004) considered *TotalBefore* and *WinsBefore* as good proxies for measuring coaching ability. In addition, Barros, Frick and Passos (2009) found that the probability of being dismissed was negatively related to a coach's experience and winning percentage.

Regarding previous experience as an NBA Player, Goodall, Kahn and Oswald (2011) found that former star players make better coaches. In addition, this expert knowledge effect was large. Therefore, we hypothesize that previous experience as a professional player increases the likelihood of a successful coaching change.

Finally, the difference between the fraction of games played in a season before and after the coaching change (*Split*) should be included to determine whether there is a "time effect," that is, if managing more games improves coaching performance.

The dependent variable in our model is *Diff*, the difference in the fraction of games won between the new coach and the old coach. A positive value for *Diff* indicates that the new coach improved performance. We estimate four models including some subset of the following independent variables: *TotalBefore, WinsBefore, PctWinsBefore*, *MinutesPlayed*, and *Split*.

Results

A total of 203 midseason coaching changes occurred in the 61 year of history of the NBA, an average of 3.32 changes per year. Table 1 shows the distribution of changes. Given the heterogeneity in the number of games in a season over the period, we normalized the changes to changes per 1230 games because this is the number of games played each season in the NBA since the 2004–05 season.

The coaching changes over this period involved a total of 158 different coaches, with 127 having no previous NBA coaching experience, although six had coached previously in the BAA or ABA. At the extremes, the Buffalo Braves replaced Dolph Shayes with Johnny McCarthy in 1971 after the first game, and the Atlanta Hawks replaced Hubie Brown with Mike Fratello for the last three games of the 1981 season. Thirty-six of these replacement coaches were themselves replaced before the season's end. Twenty-two of these could be considered "temporary coaches" because they managed four games or less.

As stated previously we measure performance as the difference in fraction of games won between the new coach and the old coach. We find that the new coach improved performance in 112 of the 184 instances we examined (some cases are dropped due to missing values of some variables in the analysis). The average improvement in performance was an increase in the fraction of games won of 0.038 with a standard deviation of 0.169. The largest decrease in performance was a change in the fraction of games won of 0.60 and the largest increase in performance was a change in the fraction of games won of 0.54. Fifteen of the coaching changes examined led to a decrease in the fraction of games exceeding 0.20, while 26 of the coaching changes led to an increase of at least 0.20 in the fraction of games won. We wish to examine in detail the factors associated with a successful coaching change by using multiple regression methods.

Estimation results are given in Table 2. Column 2 of Table 2 gives the means and standard deviations of the independent variables for reference. Four regression models are estimated. Model 1 includes *WinsBefore* as the measure of previous coaching experience, Model 2 includes *TotalBefore* as the measure of previous coaching experience, and Model 3 includes *PctWinsBefore* as the measure of previous coaching experience. Model 4 includes both *TotalBefore* and *PctWinsBefore*. Split and MinutesPlayed are included in each model.

The results from estimating the Model 1 are given in column 3 of Table 2. The R^2 for the model is 0.196. The coefficients of *MinutesPlayed* and *Split* are statistically significant at the $\alpha = .05$ level, or better. Our measure of previous coaching experience, *WinsBefore*, is not quite statistically significant, but is

Table 1 Changes of Coaches by Season

Season	Teams	Avg. games	Coach changes	Total games	Changes × 1230 games	Season	Teams	Avg. games	Coach changes	Total games	Changes × 1230 games
1949–50	17	66	4	561	8.8	1980–81	23	82	4	943	5.2
1950–51	11	64	4	354	13.9	1981–82	23	82	7	943	9.1
1951–52	10	66	1	330	3.7	1982–83	23	82	1	943	1.3
1952–53	10	70	1	351	3.5	1983–84	23	82	1	943	1.3
1953–54	9	72	1	324	3.8	1984–85	23	82	2	943	2.6
1954–55	9	72	0	288	0.0	1985–86	23	82	2	943	2.6
1955–56	8	72	1	288	4.3	1986–87	23	82	3	943	3.9
1956–57	8	72	3	288	12.8	1987–88	23	82	6	943	7.8
1957–58	8	72	2	288	8.5	1988–89	25	82	6	1025	7.2
1958–59	8	72	2	288	8.5	1989–90	27	82	3	1107	3.3
1959–60	8	75	3	300	12.3	1990–91	27	82	2	1107	2.2
1960–61	8	79	0	316	0.0	1991–92	27	82	8	1107	8.9
1961–62	9	80	3	360	10.3	1992–93	27	82	5	1107	5.6
1962–63	9	80	1	360	3.4	1993–94	27	82	2	1107	2.2
1963–64	9	80	0	360	0.0	1994–95	27	82	4	1107	4.4
1964–65	9	80	3	360	10.3	1995–96	29	82	3	1189	3.1
1965–66	9	80	1	360	3.4	1996–97	29	82	8	1189	8.3
1966–67	10	81	3	405	9.1	1997–98	29	82	3	1189	3.1
1967–68	12	82	1	492	2.5	1998–99	29	50	5	725	8.5
1968–69	14	82	1	574	2.1	1999–00	29	82	6	1189	6.2
1969–70	14	82	3	574	6.4	2000–01	29	82	2	1189	2.1
1970–71	17	82	0	697	0.0	2001–02	29	82	6	1189	6.2
1971–72	17	82	4	697	7.1	2002–03	29	82	4	1189	4.1
1972–73	17	82	5	697	8.8	2003–04	29	82	9	1189	9.3
1973–74	17	82	2	697	3.5	2004–05	30	82	10	1230	10.0
1974–75	18	82	2	738	3.3	2005–06	30	82	3	1230	3.0
1975–76	18	82	2	738	3.3	2006–07	30	82	3	1230	3.0
1976–77	22	82	4	902	5.5	2007–08	30	82	2	1230	2.0
1977–78	22	82	5	902	6.8	2008–09	30	82	9	1230	9.0
1978–79	22	82	4	902	5.5	2009–10	30	82	4	1230	4.0
1979–80	22	82	4	902	5.5	Total			203	48521	

Table 2 Summary Statistics and Estimation Results

Variable	Means (Stnd. Dev.)	Model 1	Model 2	Model 3	Model 4
Intercept	——-	-0.006 (0.37)	-0.007 (0.41)	-0.014 (0.79)	-0.014 (0.80)
WinsBefore(1,000)	0.086 (0.21)	0.078 (1.43)	——-	——-	——-
TotalBefore (1,000)	0.171 (0.39)	——-	0.043 (1.45)		0.018 (0.48)
PctWinsBefore	0.175 (0.24)	——-	——-	0.083* (1.77)	0.066 (1.11)
MinutesPlayed (1,000)	9.967 (11.41)	0.002** (2.49)	0.002** (2.50)	0.002** (2.47)	0.002** (2.48)
Split	-0.087 (0.45)	-0.141** (5.50)	-0.141** (5.51)	-0.143** (5.63)	-0.141** (5.52)
R^2	——-	0.196	0.196	0.201	0.202
NOBS	184	184	184	184	184

*p<.10, **p < .05

positive indicating that there is value to hiring a coach with experience. The estimation results for Model 2, including *TotalBefore* are given in column 4 of Table 2. The estimation results look quite similar to that of the previous model. Again, the coefficients of the variables *MinutesPlayed* and *Split* have statistically significant coefficients. The model R^2 remains 0.196. The estimation results for Model 3, including *PctWinsBefore* are given in column 4 of Table 2. The estimation results are similar to those for Models 1 and 2 with the exception that the coefficient of *PctWinsBefore*, a measure of previous coaching experience, is positive and statistically significant at the $\alpha = .10$ level. Again, the coefficients of the variables *MinutesPlayed* and *Split* have statistically significant coefficients and the model R^2 improves slightly to 0.201. Column 5 contains the estimation results for our model with both *TotalBefore* and *PctWinsBefore* included. Neither variable has a statistically significant coefficient. However, the magnitudes and statistical significance of the coefficients of *MinutesPlayed* and *Split* and very similar to the findings for the other models estimated.

Discussion and Managerial Implications

We examined all of the midseason coaching changes in the history of the NBA. We statistically compared the fraction of games won for each team before and after the change, and estimated a model to determine factors associated with a successful coaching change. We find that a midseason coaching change improved team performance in about sixty-one percent of the cases.

We find some evidence that the likelihood that the new coach improves team performance increases with experience (the coefficients of each measure of coaching ability are positive, though only the coefficient of *PctWinsBefore* achieves statistical significance in Model 3). We also find that improved performance is positively associated with previous experience as an NBA player (defined by the number of minutes played). For every 1,000 min played, the increase in the fraction of games won increases by about 0.002. The sample mean for this variable is just under ten (thousand) with a maximum just under 40 (thousand). We also find that performance is negatively related to the fraction of games coached by the "replaced" coach. This implies that improvement in performance is more likely to occur the larger the number of games played for the new coach–this finding indicates the importance a stable coaching situation which affords the time for the players to integrate the new coach's playing philosophy.

It seems clear that if owners want to improve team performance when they hire a new coach midseason, they should hire a coach with experience as NBA coach and as an NBA player. However, coaches with these attributes are among the highest paid so owners and general managers face a trade-off between experience and salary. Given that the average salary for NBA coaches in 2010 is estimated to be $3.4 million (see http://www.insidehoops.com/nbasalaries.shtml), and that the average salary in 2010 for the top six NBA coaches is about $7.1 million (see http://www.electro-mech.com/team-sports/basketball/top-10-basketball-coaches-with-the-highest-salaries/), we estimate the difference between salaries of coaches with previous experience as a player and/or as a coach and coaches without similar experience to be as much as $3 to $5 million, a not inconsequential difference.

Three limitations of our study should be mentioned. One, we did not control for midseason player transactions. These transactions could raise or lower the quality of the team, and thus could be a source of systematic noise in our analysis. Although data on transactions are available at www.basketball-reference.com, it would be nearly impossible to predict how these roster changes would influence our results. A possible solution to this problem would be to consider player talent as a proxy for roster quality, similar to tthe approach used by Fizel and D'itri (1999). However, exactly how to measure talent is a controversial issue in basketball (see Berri &

Bradbury, 2010; Berri & Schmidt, 2010). In any case, most important changes in rosters are usually made at season's end. Second, we did not distinguish between coaching changes occurring because the previous coach was fired or resigned. Some of the coaches in our study voluntarily resigned. Obtaining reliable data on this distinction is difficult–coaches frequently decide to "step down"—but could certainly does affect our results. However, this limitation should not affect our examination of factors related to a successful hire. The third limitation is that we only examine characteristics of new coaches following a midseason coaching change. One could make use of characteristics of the fired coaches to examine *whether* a midseason coaching change is made. Our focus on the current study is on only those cases where a change was made in an effort to determine the characteristics of a successful new hire. That is, we are looking at the success of a coaching change and not the timing of the change.

Conclusion

Making a midseason coaching change is one of the most difficult decisions faced by sports managers. Making a change involves paying new coaches, paying fired coaches, and a significant disruption to the team all in the hope of improved performance. Midseason coaching changes are made because the team failed to meet expectations given the level of talent. If the decision to replace a coach is made it is because the coach either had a poor plan for using the talent or the players were not following the coaches plan.

In our analysis we find that a midseason coaching change leads to improved team performance in about sixty-one percent of the cases examined. We also find that making a successful midseason coaching change is significantly related to hiring a new coach with previous experience as an NBA player. A new coach with significant NBA playing experience is likely to have some name recognition and credibility with the players, making them more likely to follow the coach's direction. We also find that the earlier in the season the changes made the more likely improvements in performance will result. This finding is certainly due to the fact that a new coach is likely to bring a new system and new personality and it will take time for the players to adjust to both. We also find weak evidence that previous NBA experience as a coach is positively related to an improvement in performance, although this result is statistically significant in only one of our four models.

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