What Happened to the Player Manager in Professional Baseball?

Craig A. Depken, II
Department of Economics
The Belk College of Business
UNC Charlotte
Charlotte, NC 28223
cdepken@uncc.edu

Preliminary Analysis: Caveat Emptor

What Happened to the Player Manager in Professional Baseball?

Abstract

This paper investigates the evolution of the manager's position in professional baseball from 1871 to the present. Early in the history of professional baseball the player-manager was a popular model yet by 1956 the player manager had all but disappeared. This paper provides empirical evidence that player-managers were not dramatically more or less effective than their bench-manager counterparts. However, player-managers, who were often one of the best players on their team, suffered considerable reduction in productivity as a player. Therefore, the demise of the player manager seems to have been a natural outcome of increased opportunity cost of the player-manager model.

JEL Classifications: L83, J24

Keywords: sports, managerial efficiency, labor relations, player productivity

1. Introduction

In 1871, the first year of the National Association (which later became the National League), ten of eleven managers were so-called player managers, that is the team's manager was also a position player on a regular basis. In 1875, nineteen different managers coached thirteen teams in the National Association, and all but one were player-managers. The player-manager in professional baseball continued to share duties with so-called bench managers until 1956, the first year of professional baseball in which no player-managers served during the season. From 1871 through 1955, player-managers comprised 41% of all managerial positions in professional baseball across seven different leagues (the American Association, the American League, the Federal League, the National Association, the National League, the Players' League, and the United Association). After 1955, the player manager was a rarity; only ten player managers served from 1956 through 2009 comprising 0.6% of all managerial positions.[1]

The dramatic demise of the player-manager seems to be a question that has gone unanswered in the economics literature. There may be a number of reasons this has been the case, yet the question of what happened to the player manager seems conducive to theoretical and empirical analysis. This paper introduces both discussions surrounding the evolution of the manager position in professional baseball, including why the bench manager may have come to dominate the position, and empirical analysis in three distinct areas: first, a descriptive analysis of how the manager position has evolved over the course of professional baseball history; second, an analysis of managerial effectiveness and whether player-managers were "better" managers than their bench-manager counterparts; and third, an analysis of how quality of play was impacted by the role of player-manager, focusing both on those individuals who were selected to be player-managers and those who were not. The theoretical discussion provides potential insights into the role of the manager on professional baseball teams and also provides a number of

[1] These were Solly Hemus (1959 St. Louis Cardinals, 24 games played), Hank Bauer (1961, Kansas City Athletics, 43 games played), El Tappe (1962, Chicago Cubs, 26 games played), Frank Robinson (1975 and 1976 Cleveland Indians, 49 and 36 games played, respectively), Joe Torre (1977, New York Mets, 26 games played), Don Kessinger (1979, Chicago White Sox, 56 games played), and Pete Rose (1984, 1985, and 1986 Cincinnati Reds, 26 [partial season with the Reds], 119 and 72 games played respectively).

avenues for future research. The empirical evidence provided here suggests that player managers might have been only slightly worse managers than their bench-manager counterparts. However, player managers suffered a significant reduction in on-the-field production while serving the dual role of player-manager, and the negative impact increased over time. The empirical evidence suggests that the opportunity cost of the player-manager increased throughout the first half of the twentieth century making the bench-manager model more attractive.

2. Evolution of the Manager Position in Professional Baseball

Early in the history of professional baseball, the number of teams and highly skilled players were naturally relatively few in number. In 1871, the first year of the National Association, nine teams played an unbalanced schedule of 302 games (teams averaged between 19 and 33 games during the season). One hundred and fifteen players participated in these games and ten of these were tapped to be a player-manager during the course of the season and ninety percent of all managerial positions were filled by player-managers. Over the next several decades, the player-manager remained a popular institution for most professional baseball teams.

Figure 1 shows the percentage of all managerial positions occupied by player-managers across all professional leagues. As can be seen, the percentage of managers who were player managers started high and fell to 25% in 1888 before rebounding and remaining above 40% until 1917, after which the percentage of player managers fell below 25% from 1917 through 1923. The percentage of managers who were player-managers recovered slightly during the inter-war years, reaching a peak of approximately 50% from 1934-1936 before falling below 30% after 1939 and never recovering beyond that until the player-manager effectively disappears from the baseball landscape after the Second World War.

During the period 1871-1950 the percentage of managers who were player-managers seems to have been negatively correlated with years during which the United States was in declared conflict, including the Spanish-American War, World War I and World War II. In war years the percentage of managers who were player-managers fell by twenty percentage points. This suggests that those players who would have been tapped as player managers might have been out of baseball during the war years

and therefore team owners turned to bench managers to make tactical and strategic decisions during the games and season.

Another view into the evolution of the manager's position is how many times a bench manager replaced a player manager and vice-versa. Through 2009 there had been 3,201 manager-years or partial-years in the history of professional baseball across all leagues that have existed (except for the All-American Girls Professional Baseball League and the so-called Negro Leagues). During these manager-years, eighty seven player managers were replaced with another player manager and eighty bench managers were replaced by a player manager. However, the vast majority of these managerial changes took place before 1935, after which it was most common to replace a manager, whether a bench or player manager, with a bench manager. Therefore, over the first third of the twenty-first century the popularity of the player-manager was already on the wane – the player managers who continued to manage through the Second World War were holdovers from previous years and were not newly installed player-managers.

3. Benefits and Costs of the Player Manager

The evolution of the player manager over the first half of the twentieth century suggests that, although the arrangement might have at one time provided a net benefit to team owners, the relative benefits of the bench manager eventually outweighed the relative benefits of the player-manager. In other words, team owners found it advantageous to move away from the player manager to the bench manager over time. Yet, why not start with a bench manager at the beginning of organized professional baseball? Why did not all franchises move to bench managers at the same time? The heterogeneity in the timing of moving to bench managers suggests that various teams experienced different net benefits from the player manager.

In theory, player managers provide a number of benefits for team owners. First, there are obvious economies of scope in the player-manager model as the team owner obtains both player and manager services from a single individual, perhaps at a lower cost than if the roles were filled with different individuals. For example, Mel Ott was paid $18,000 in 1941 to play right field for the New York Giants but was paid $25,000 to be a player manager for the same team in 1942 (Stein, 2002). Thus, the Giants

obtained a manger for an additional $7,000 when the average price for a bench manager was likely greater.[2]

An additional set of benefits might arise on the field of play. Player managers might garner tactical and strategic insights during a game that a bench manager might not. This might occur if the player manager utilizes information about how the particular game evolves, how players respond to different situations, or how the umpires are calling the game, in ways that are both different than bench managers and which lead to higher probabilities that the team will win. In a similar vein, player managers might also have a better feel for how individual players are playing at different points of the game and might thereby make better personnel decisions during the course of the game. Player-managers might have more collegial relationships with team members such that the player-manager can coax additional effort or team work from the other players on the team. Finally, the player-manager might have a more contemporaneous view of strategy and technique which might provide an advantage over a team with a bench manager.

On the other hand, player managers can carry a substantial number of costs that are not at issue with bench managers. For instance, player managers might treat themselves or other selected players favorably compared to other players on the team. Player managers might provide themselves or their favored players more playing time or other perks that run counter to the best interests of the team. Furthermore, managers generally take it upon themselves to criticize umpires and run the risk of being dismissed from the game. Player-managers might be more reluctant to engage in such behavior because being dismissed from the game imposes additional costs to the team.

Player managers might be distracted while playing their position during the game and might miss critical information about his or the opposing team. This, in turn, might lead the player-manager to make tactical, strategic, or personnel decisions that decrease the odds of team success. Finally, player managers

[2] Unfortunately salary information from the early period of professional baseball (indeed pre-1985) is notoriously hard to find. However, Murray and Haupert (2010) might be a source for information on salaries from this time period.

were often high-quality (in many cases Hall of Fame) players in their own right. To the extent that engaging in both playing a position and managing distracts from playing a position, player managers might also harm their teams by performing worse as a player.

While the aforementioned costs of the player manager are on-the-field matters, the player-manager model introduced several off-the-field concerns that do not pertain to bench managers. For instance, player-managers introduce potentially difficult worker-employer relations. A player manager might have been harder to fire as a player, and yet retain as a manager, or to fire as a manager and retain as a player. On the other hand, having a player and a bench manager separates the two jobs and provides more flexibility to team owners.

The early adoption of the player-manager model might have been the natural result of a fundamental lack of supply of bench-managers. Early in the history of professional baseball there were no ex-players or others who had specialized knowledge of how to best manage a baseball team and make regular or extraordinary decisions during the course of a game and season. Over time, however, the supply of experienced ex-players and ex-managers increased and this might have made it cheaper and easier to hire bench managers (I note that for this version of the paper, I have no data to support this claim but I hope to have that finished before the final version of the paper).

Finally, it is entirely possible that player managers just were not as good as their bench manager counterparts and thus owners, as they discovered that player managers were not that good, moved toward replacing player managers with bench managers.

4. What Happened to the Player Manager? Empirical Evidence

The previous section outlined several benefits and costs of the player manager relative to the bench manager. In this section, two empirical analyses are undertaken. The first investigates whether managerial efficiency systematically differed between bench and player managers. The second investigates whether player managers were impacted in their quality of play while they were managers.

Managerial Efficiency

The investigation of managerial efficiency in team sports has been undertaken in a number of different studies, including Porter and Scully (1982), Scully (1994), and Volz (2008) in baseball and Dawson, et al (2000) and Carmichael, et al (2001) in English football, to name just a few. While the particular estimation method is not terribly controversial, in professional baseball the greater debate centers on exactly how to model the production of a baseball team. This paper does not seek to contribute to that debate. Rather, the goal is to estimate managerial efficiency in a manner conducive to testing whether there were systematic differences in the efficiency of player and bench managers. If, for example, player managers were considerably less efficient than their bench-manager counterparts, this would provide an incentive for owners to move away from the player-manager model. On the other hand, if player managers were considerably more efficient than their bench-manager counterparts, this would suggest some other reason was the cause of the demise of the player manager.

To estimate managerial efficiency, the parsimonious production function of Scully (1974) is utilized where team quality, measured by winning percentage (WINPCT), is a function of team offense, measured by slugging percentage (SA), team defense, measured as team strike out-to-walk ratio (SW), year-specific fixed effects to control for changes in baseball shared by all professional teams, and a vector of league-specific dummy variables to control for league-specific unobserved heterogeneity:

$$\ln WINPCT_{it} = \gamma_t + \beta_1 \ln SA_{ijt} + \beta_2 \ln SW_{ijt} + \phi LEAGUE + \varepsilon_{it,}$$

where the continuous dependent and independent variables have been transformed into natural logarithms, γ_t is a fixed effect for year *t,* the β's and the vector ϕ are parameters to be estimated, and $\varepsilon_{it} = v_{it} - u_{it}$, where v_{it} is a white noise error term and u_{it} is a one-sided variable that reflects the technical inefficiency of the team.

Data for every professional baseball team from 1871 through 2009 were collected from Sean Lahman's database and the production function was estimated using stochastic frontier analysis assuming that u_{it} are independently exponentially distributed. While the Lahman database reports the wins and losses for each manager, no matter how many games he managed during a season, the production function

is estimated using teams that had a single manager for the entire season. The descriptive statistics of the data employed in estimating the production function are reported in Table 1a and Table 1b.

Teams in the sample averaged 75 wins per season, with the minimum number of wins being 1 and the maximum being 116, but these wins were earned in different leagues with different season lengths. To put the wins per season in perspective, the average number of wins of the teams used to estimate managerial efficiency is .508, which is slightly higher than even because several teams played odd-game schedules during the early years of professional baseball. The average team over the history of professional baseball had a slugging average of 0.379, suggesting that every at bat yielded slightly more than one third of a total base, and a strike-out to walk ratio of 1.5. Table 1b reports the distribution of team-year observations across six different professional leagues, not including the so-called Negro Leagues, listed in alphabetical order. The National League, the oldest league in professional baseball, contributes the most team-year observations to the sample at 1,064, whereas the United Association, which lasted only one year in 1888, and the players' association, which lasted only one year in 1890, contributed 8 and 5 observations, respectively.

The primary parameters of interest from the estimated production function are reported in Table 1c; the year fixed effects are not reported for brevity. The partial elasticity of wins with respect to slugging average is approximately 1.21 and the partial elasticity of strike-out to walk ratio is 0.274. These results are used to estimate the technical efficiency of each team and each year. The average technical efficiency across all 2078 team-years was 0.822, with a maximum of one and a minimum of 0.026. Among the ten least efficient teams, all from the 1870s and 1880s, three were managed by player managers. Among the ten most efficient teams, from various decades of baseball's history, three were managed by player managers.

The player manager model might have fallen out of favor with ownership if, over time, owners discovered that player managers were less efficient than their bench manager counterparts. The average technical efficiency of 395 player-managed teams was 0.804 and the average technical efficiency of 1683 bench-managed teams was 0.826. A simple t-test suggests that the difference between the two groups of

teams of 0.022 is statistically meaningful (t=3.147, p = 0.001). However, this unconditional difference does not control for other differences across managers.

To control for more than just one characteristic of the manager, an auxiliary regression is estimated where the technical efficiency of each team is related to characteristics of its manager and league-specific fixed effects. Specifically, the technical efficiency of each team is regressed against the number of years of managerial experience of the current manager (and its quadratic), whether the team is currently coached by a player-manager, the player-manager dummy variable interacted with time, whether the manager had been a player-manager during his playing days, and league specific fixed-effects. The results are reported in Table 1d, along with descriptive statistics of the variables. The evidence suggests that the unconditional difference between the technical efficiency of teams with bench managers and those with player managers is not necessarily caused by the player manager. As managers have more experience, their teams are more technically efficient, but at a decreasing rate, as evidenced by the negative parameter estimate on the quadratic of years managed. Player managers are not materially better or worse than their bench-manager counterparts as evidenced by the statistically insignificant parameter estimate on that variable. Moreover, there was no change in the impact of player managers over time as evidenced by the insignificant parameter estimate on the interaction between the player-manager dummy variable and time. However, teams managed by coaches who, during their playing days, were also player-managers, are slightly less efficient than other teams.

The stochastic frontier analysis suggests there were no advantages (or disadvantages) to the player-manager model in the dimension of managerial efficiency in combining inputs to produce output. While there is some evidence that retired players who were player-managers were not as efficient as other managers, these differences do not seem substantial enough on their own to justify team owners abandoning the player-manager model.

Player-Manager Productivity

An alternative explanation for the demise of the player-manager model is that player-managers suffered sufficient reduction in their player-oriented productivity such that the costs of the player-manager model

to owners increased. To test this hypothesis, player productivity is related to player characteristics, manager characteristics, and league characteristics.

There has been considerable debate about how to most appropriately measure player productivity in professional baseball. Gerald Scully proposes a two-step method in which the production function estimated in the previous section is used to determine the player's marginal contribution to the team's winning percentage, an approach also used by Ashcraft and Depken (2006). Alternatives include measuring player production in terms of runs earned or runs allowed, in terms of average replacement players, and so forth. Another alternative is to allocate each team's wins to each team member in what is called Total Win Share. This somewhat complicated formula, developed by the noted baseball statistician Bill James, accounts for all aspects of a player's game, including batting, fielding, base running, and strategic contributions such as bunts and sacrifice flies, and allocates each player a portion of his team's wins at the end of the season.[3]

The total win shares for every player in major league history from 1876 through 2008 were obtained from Dave Studeman at *The Hardball Times* in early 2010. As this study is interested in comparing the productivity of all players in major league baseball who were player managers with those who were not, controlling for position, time period, league played, and player characteristics, this database is merged with the Lahman database to create a sample describing all baseball players in the various Major Leagues (excluding the All American Girls Professional League of the 1940s-1950s, the Negro Leagues, and the various minor leagues).

Various specifications are estimated in which player win-share is related to various player and team characteristics:

$$WINSHARE_{i,t} = \beta PLAYER_{i,t} + \delta MANAGER_{i,t} + \varepsilon_{i,t},$$

[3] This study does seek to contribute to the debate about how to measure player productivity. Rather, as it is necessary to choose some measure of player productivity when addressing the question of whether player-managers suffered a reduction in player-oriented productivity *while* they were player-managers, total win shares was selected because it aggregates various aspects of the game including batting, fielding, pitching, and base running.

where β and δ are parameter vector to be estimated, $\varepsilon_{i,t} = u_i + v_{i,t}$, is a composite error term comprised of a player specific random effect, u_i, and white noise, $v_{i,t}$.

The vector *PLAYER* contains variables that describe the player including the player's experience in years (*EXP*) and its quadratic (*EXPSQ*), the player's body-mass index (*BMI*),[4] dummy variables identifying which of eleven positions identified in the Lahman database the player played[5], dummy variables identifying which of seven leagues the player played[6], a dummy variable indicating that the player throws right-handed, and two dummy variables indicating whether the player bats left or right.[7]

The vector MANAGER contains dummy variables that describe the manager of the team and league, including a dummy variable which takes a value of one if the player is a player-manager and zero otherwise (*PLAYERMGR*), the player-manager dummy variable interacted with a year trend variable (and the quadratic of the trend variable), a dummy variable that takes a value of one if the player is, has been, or ever will be a player-manager (*EVERPM*), a dummy variable that takes a value of one if the player's team had a player-manager (*TEAMPM*), the percentage of the teams in a player's league coached by player-managers (*PCTPM*), and a trend variable that takes a value of one in 1876 (the first year of the sample) and monotonically increases by one every year of the sample (*TREND*).

In isolation, it is anticipated that, all else equal, players with more experience have greater win shares but that the returns to experience are declining. The primary empirical question in this section is whether player-managers suffered a decrease in productivity, all else equal, and therefore the parameter estimate on the player-manager dummy variable (*PLAYERMGR*) is of particular interest in the full specification. Likewise, it is of interest whether any positive or negative impact of being a player-

[4] The body-mass index is calculated as the player's weight (in pounds) times 703 divided by the player's height (in inches) squared. As addressed below, the height and weight is not available for every player in the history of baseball.

[5] While many players are recorded as having played more than one position during the season, here players are identified by the position most often played. These positions include: first base (1B), second base (2B), short stop (SS), third base (3B), catcher (C), center field (CF), left field (LF), general outfield (OF), right field (RF), relief pitcher (RP), starting pitcher (SP); first base is the omitted category. Combining the four outfield positions into one generic "outfield" position yielded qualitatively similar results as those presented here and are available from the author upon request.

[6] The seven leagues include (in alphabetical order): The American Association, the American League, the Federal League, the National League, the Players' League, and the United Association.

[7] Switch-hitter is the omitted category.

manager on player productivity changed over time; if so, it might suggest that owners recognized a disappointing trend in the impact of player-managers on the field of play and were thus motivated to move to the bench-manager model.

It is often assumed that the player-manager was chosen from among the better players on the team. To test this conjecture, the dummy variable for having ever been/being a player manager measures whether those players who were ever tapped to be a player-manager during their career were, on average, better than their non-player-manager counterparts. If player-managers were chosen from the better players, the parameter on *EVERPM* would be positive.

While the previous section shows that teams coached by a player-manager were not less efficient in winning, all else equal, it is possible that player-managers harmed the win-shares of the players on their teams. The dummy variable for whether a player's team was coached by a player manager tests whether player-managers generated positive or negative spillovers relative to their bench-manager counterparts.[8]

While a player's win share is impacted by his own manager's decisions, the win share can also be affected by the decisions of the other managers in the league, i.e., those against whom the player plays. The percentage of teams with player-managers (*PCTPM*) tests for any positive or negative spillovers from other managers to a particular player.[9]

Finally, the trend variable attempts to capture whether win-shares are becoming more or less equally distributed. Early in baseball's history, the concentration of win-shares on a team was often very high, but over time it has appeared to decrease. The remaining variables control for time-invariant heterogeneities across positions, leagues, and player characteristics.

[8] A player might have been less productive on a player-managed team for a number of reasons. First, given the measure of productivity used here, the player-managed team might have fewer absolute wins, which would reduce the overall number of wins allocated to players on that team. Given the relatively complex nature of the win-shares calculation, which includes contributions made through batting (including base stealing), fielding, and pitching, in-game decisions by a player-manager, if untimely or unwise, could reduce a player's total win-shares relative to a similarly experienced player in the same position on a team coached by a bench-manager.

[9] The quadratic of this term was included in various specifications but was universally insignificant and was dropped from the specifications presented here.

The descriptive statistics of the data used in the estimation of the player production equation are reported in Table 2a and describe 65,663 observations of 11,058 professional baseball players from 1876-2008.[10] The average player earned a Total Win Shares of 7.36, with a minimum of -6.4 and a maximum of 89.1.[11] The average amount of experience was 4.8 years, with a minimum of zero years of experience, i.e., the player was in the first year of their professional baseball career. The average body mass index of baseball players over the entire sample period was 25.03, which suggests that baseball players have been at the upper end of the "normal weight" range of the BMI (18.5-24.9) or at the lower end of the "overweight" range of the BMI (25-29.9).[12] One half of one percent of all player-observations are associated with a player-manager, three percent of the observations are associated with players who became a player-manager at some point in their career, approximately 13% of the observations are associated with players on a team coached by a player-manager, and the average number of player managers in a given league-year was approximately 14%, although there has not been a player manager in professional baseball since 1986. Of the players in the sample, 42% were pitchers (22% were relief pitchers). The vast majority of the observations come from the American and National Leagues (97%), 80% of the observations are of right-hand throwers, and 64% are of right-hand batters.[13]

Estimation results are reported for various specifications in Table 2b; all specifications control for player-specific random effects. Model (1) is a parsimonious model that controls for player experience, BMI, time trend, position, league, and player characteristics. Experience improves total win shares at a decreasing rate, bigger players tend to contribute more win shares, and the trend is for each player to earn

[10] In most cases there is one observation per player per year. In many cases, however, there are multiple observations per player per year as players play for different teams during the course of a single season.

[11] From 1876-2008 the two lowest win shares were Hideo Nomo, who earned -6.4 win shares with the Los Angeles Dodgers in 2004, and Mike Maroth, who earned -6.2 win shares with the St. Louis Cardinals in 2007. Of the 1,226 players with negative total win shares from 1876-2008, 53% were pitchers; no other position accounted for more than 10% of these observations.

According to the formula for total win shares developed by Bill James, raw team win shares are multiplied by three so that the average player actually accounts for slightly more than 2.45 wins over the course of the season; which is consistent with the average number of wins per team during the sample period of approximately 60.

[12] A simple regression model of player BMI scores and a year time trend yields a parameter estimate of 0.009 which is statistically significant.

[13] The omitted categories are as follows: first base for positions, the American Association for leagues, left-handed for throwing, and switch-hitter for batting.

fewer win shares over time. The latter result might seem counterintuitive because teams play more games today than in the past. However, over time there are an increasing number of players who participate in one or both of the major leagues over the course of a season and therefore the average number of win shares available decreases even as the number of total games played has increased.[14]

Model (2) introduces the dummy variable for whether the player was on a team managed by a player-manager. Somewhat consistent with the results in the previous section, those players who were on a team coached by a player-manager earned approximately one-half a win share less over the course of the season. Whether this reduction occurred because of poor management decisions or because of poor play on the part of one or more teammates is unclear. However, if the roster was comprised of 26 players, the results would suggest that teams with player managers won approximately 3.7 fewer games.[15] The remaining parameter estimates remain statistically significant and retain their relative magnitudes.

Model (3) introduces whether the player was also a player-manager (*PLAYERMGR*). The parameter estimate on the player-manager dummy variable of -0.706 is statistically significant and suggests that player-managers themselves suffered an additional reduction in production beyond that experienced by the other players on his team (as reflected in the parameter on the dummy variable for whether the team had a player-manager).

Model (4) introduces the dummy variable that takes a value of one if a player is, was, or ever will be a player manager (*EVERPM*). In other words, while the player-manager dummy variable takes a value of one only in year when a player is actually a player-manager, this variable takes a value of one for all observations associated with a player who will be a player manager. Those players who were ever selected to be a player-manager averaged 5.5 win shares more per season than their non-player-manager counterparts. However, while the player served the double role of player-manager their productivity fell by approximately 3.0 win shares per season. This suggests that the specification in Model (3) is not

[14] In 1981 there were 962 players who participated in one or both of the leagues. In 1999, the year after the last expansion of the MLB, 1,323 players participated in one or both of the leagues. By 2008, there were 1,407 players who participated in one or both of the leagues.

[15] A simple regression of total team wins against a dummy variable for whether the team was coached a majority of the season by a player-manager suggests that player managers coached teams with 7.4 fewer wins, on average.

correct as the effect of the player-manager is biased down because the specification confounds the general higher quality of the player-manager *qua* player and the reduced productivity the player-manager suffers as a result of their double duty.

Model (5) introduces a linear and quadratic time trend interacted with the player-manager dummy variable. These interactions test for whether there were temporal changes in the impact of being a player-manager on player performance. While the individual parameters are not statistically significant on their own, they are jointly weakly significant (p=0.08) and suggest that in the early years of baseball the temporal impact of being a player-manager was positive but at a decreasing rate. Eventually, the temporal benefits of being a player manager were maximized at or around 1903 and turned negative at or around 1957. The temporal pattern of the total impact of being a player-manager on the players who were chosen to serve this double role is depicted in Figure 2. As can be seen, in the early years of baseball the net impact of being a player-manager on player win shares was positive but relatively modest, reaching a peak of approximately 2.3 additional win shares per season in 1903. After that the net impacts of being a player-manager declined until finally turning negative in 1957. Interestingly enough 1956 was the first full year in which there were no player managers in either of the two major leagues, providing anecdotal support for the empirical findings: the econometric evidence suggests that the benefits of the player-manager were declining throughout the early twentieth-century and owner behavior of moving toward the bench-manager model would seem to support this hypothesis.

However, there is another possibility. Perhaps as more teams moved toward the bench manager, major league teams reached a tipping point after which the player-manager was no longer a viable model. In other words, if the majority of teams employed the player-manager model then while absolute productivity might decline relative productivity might not. However, as more teams moved to the bench-manager model, the player-manager became both absolutely and relatively less productive, motivating team owners to even further abandon the player-manager. To test this hypothesis the percentage of a league's teams coached by a player-manager in a given year is included in Model (6). There does not

appear to be any additional cost in terms of player productivity when the player's league has more or less of the teams coached by player-managers.

The specifications in Model (2) through Model (6) tell a consistent story. While experience and body size remain statistically important and economically meaningful contributors to each player's annual win shares, whether the team is managed by a player manager and whether the player himself is a player manager also contribute to the overall productivity of the player-manager *qua* player. One concern is that there are 10,582 player-observations which are missing one or both of the components of the body mass index calculation: height and/or weight. There might be grounds for concern about sample selection bias if those observations for which the BMI is not calculated came from the early years of professional baseball when there were more player managers. These omitted observations might cause the parameter estimates to be biased. In Model (7) in Table 2b, all the regressors of the full specification are included except for the body mass index. This increases the sample size by 6,335 observations of which 173 are associated with a player-manager.

As can be seen, the parameters of interest hardly change in their magnitudes, although the negative impact of being a player manager declines from -3.137 to -2.372 (a decrease of approximately 25%), and the impact of the percentage of a league's teams that are coached by player managers increases from 0.147 to 0.396 and is significant at the 10% level. Thus, inclusion of the additional observations for which the BMI is not available suggests that the impact on productivity of being a player-manager was still negative and statistically significant if slightly less dramatic as in the restricted sample. Furthermore, there is slight evidence that the more teams in a league that were coached by player-managers the more win shares a player would accumulate, all else equal.

Among the various specifications the remaining parameter estimates are remarkably stable. Among the various positions, center field is the position that garners the most win shares relative to the first baseman, while catchers, designated hitters, and relief pitchers battle for the positions associated with the fewest win shares relative to the first baseman. Players in the American League, National League, and the United Association average fewer win shares relative to the players in the American Association. Right

handed throwers average slightly more win shares in a statistical sense but not in an economically meaningful way. On the other hand, switch hitters and left-handed hitters are associated with approximately 0.7 more win shares than right-handed hitters (or about 0.2 more absolute wins per season).

Overall, the empirical evidence suggests that player-managers were significantly less productive as players while they were player-managers. To the extent that these players were among the best players on their team, their foregone improved performance could have been the margin for post-season play, or perhaps a better ranking at the end of the season which might have increased attendance in subsequent years.[16] Therefore, while the dual role of player and manager might have reduced nominal costs to the team owner, there was an increasing opportunity cost to the player-manager model which suggests that, all else equal, the net economic benefits of the model were declining throughout the first half of the twentieth century so that eventually the model was abandoned for the bench-manager model.

5. Concluding Remarks

So what happened to the player manager in professional baseball? The obvious answer is they went away - there hasn't been a player manager in the sport since 1986. Yet, the obvious answer invites deeper analysis of what happened to the player manager position over the course of the twentieth century. This study has undertaken two steps in a multi-step process to identify the underlying factors explaining why team owners moved from the player-manager to the bench-manager model. There are a number of theoretical costs and benefits of both models and thus it seems that the expected net benefits of the bench-manager model currently dominate. However, over the history of professional baseball, especially in its early decades, the player manager was rather common and only after World War II did the player manager essentially disappear from the landscape.

[16] Both attendance and post-season play have become more valuable to team owners over time. Post-season tickets are often more than three times regular season prices. Attendance has also become more valuable as the average real ticket price (2009 dollars) has approximately doubled in real terms from $14.60 in 1952 to $26.64 in 2009. Depken (2000), among others, shows that attendance is positively related to the previous season's winning percentage.

On the one hand it might be the case that player mangers were just bad managers and were replaced with better bench-managers over time. Stochastic frontier analysis of a simple baseball team production function suggests that player managers were slightly less technically efficient than their bench-manager counterparts but that the reduced efficiency was not dramatic and did not change that much over time. Although team owners might have been more than compensated for the slightly reduced efficiency by not having to pay a separate individual to be a bench manager, it seems unlikely that a lack of managerial efficiency was what motivated team owners to abandon the player-manager model.

An alternative explanation is that the player-manager model was abandoned because of its impact on player productivity. To the extent that the dual role of manager distracted players from providing full effort and concentration on playing the game, the player-manager model might have reduced player productivity and thus team quality. As the majority of player-managers were high quality players, their distraction would represent an opportunity cost to the team that could be avoided if a bench manager were making the strategic and tactical decisions. Measuring player productivity using team win shares, players on teams with player-managers earned fewer win shares than players on bench-managed teams. Also, while the best players were chosen to be player managers, these players suffered significant reductions in playing quality while they were player managers. Indeed, the benefits of being a player manager, represented by team win shares, were maximized in the early 1900s and became negative in the mid-1950s, exactly when the player-manager model was on its last legs.

Therefore, the econometric analysis and the anecdotal analysis seem to concur that the net benefits of having a player-manager were declining throughout the first half of the twentieth century and that the bench-manager model might have been a natural result of increasing opportunity cost on the field of play. Additional analysis is required to understand to what extent other costs and benefits might have played a part in ending the player-manager model, yet the current study seems to offer strong evidence that the end of the player-manager model might have been a completely natural process.

References

Ashcraft, Jennifer and Craig A. Depken, II (2006), "The Introduction of the Reserve Clause in Major League Baseball: Evidence of its Impact on Select Player Salaries during the 1880s," *mimeo,* Department of Economics, University of North Carolina at Charlotte.

Carmichael, Fiona, Dennis Thomas and Robert Ward (2001), "Production and Efficiency in Association Football," *Journal of Sports Economics,* 2(3), pp. 228-243.

Dawson, Peter, Stephen Dobson, and Bill Gerrard (2000), "Stochastic Frontiers and the Temporal Structure of Managerial Efficiency in English Soccer," *Journal of Sports Economics,* 1(4), pp. 341-362.

Depken, Craig A. II (2000), "Fan Loyalty and Stadium Funding in Professional Baseball,"*Journal of Sports Economics,* 12(2), pp. 124-138.

Murray, James and Michael J. Haupert (2010), "Regime Switching and Wages in Major League Baseball under the Reserve Clause," *mimeo,* University of Wisconsin – La Crosse.

Porter, Phillip and Gerald Scully (1982), "Measuring Managerial Efficiency: the Case of Baseball," *Southern Economic Journal,* 48(3), pp. 642-650.

Scully, Gerald (1994), "Managerial Efficiency and Survivability in Professional Team Sports," *Managerial and Decision Economics,* 15(5), pp. 403-411.

Stein, Fred (2002), *And the Skipper Bats Cleanup: A History of the Baseball Player-Manager*, McFarland & Company Publishers, Jefferson, North Carolina.

Volz, Brian (2008), "Minority Status and Managerial Survival in Major League Baseball," *mimeo,* Department of Economics, University of Connecticut.

Table 1a: Descriptive Statistics of Data used to Estimate Team Production Function

Variable	Mean	Std. Dev.	Minimum	Maximum
WINS	75	17.54	1	116
SA	0.379	0.041	0.227	0.491
SW	1.501	0.641	0	10.692
Notes: 2078 professional baseball teams from 1871-2009.				

Table 1b: Leagues Included in Team Production Function Estimation

League	Years in Existence	Total number of observations
American Association	1882-1891	64
American League	1901-2009	894
Federal League	1914-1915	11
National Association	1871-1875	32
National League	1876-2009	1,064
Players' League	1890	5
United Association	1884	8

Table 1c: Production Function Estimation Results

Variable	Coefficient	Standard Error (x 10^{-6})
SA	1.121	6.24
SW	0.274	7.85
American League	-0.087	2.76
Federal League	-0.201	1.64
National Association	-0.487	0.198
National League	-0.092	3.52
Players' League	-0.124	1.26
United Association	-0.433	0.149
Notes: Specification includes year-specific fixed effects not reported for brevity. All parameters reported statistically significant at the 99% confidence level. Dependent variable is natural log of wins. Independent variables enter the estimation in natural logs. N=2078		

Table 1d: Technical Efficiency as a Function of Manager Characteristics

Variable	Coefficient	Standard Error	Mean	Std. Dev.	Minimum	Maximum
Technical Efficiency			0.822	0.128	0.026	1.00
Years Managed	0.006**	0.001	6.213	6.358	1	50
Years Managed Squared	-0.0002**	0.00003	79.027	198.632	1	2500
Player Manager	-0.337	0.717	0.190	0.128	0	1
Player Manager x Time	0.0001	0.0003	344	734	0	1986
Ever a Player Manager	-0.031**	0.008	0.150	0.357	0	1
American League	0.088**	0.024	0.430	0.495	0	1
Federal League	0.124**	0.042	0.005	0.072	0	1
National Association	-0.145**	0.063	0.015	0.123	0	1
National League	0.079**	0.024	0.512	0.499	0	1
Players' League	0.162**	0.050	0.002	0.049	0	1
United Association	-0.299**	0.136	0.004	0.062	0	1
Constant	0.723**	0.024			0	1
Notes: Regression based on 2,078 team-year observations. Robust standard errors reported. ** $p<0.05$						

Table 2a: Descriptive Statistics for Total Win Shares Analysis

Variable	Description	Mean	Std. Dev.	Min	Max
WINSHARES	Total Win shares	7.362	7.983	-6.4	89.1
EXP	Experience	4.836	4.338	0	32
EXPSQ	Experience Squared	42.221	66.249	0	1024
BMI	Body Mass Index	25.031	1.792	17.718	38.179
PLAYERMGR	Player Manger (1=Yes)	0.005	0.072	0	1
PMTREND	PM x Trend	0.179	2.971	0	110
PMTRENDSQ	PM x Trend Squared	8.858	192.818	0	12100
EVERPM	Ever a PM (1=Yes)	0.029	0.169	0	1
TEAMPM	Team Has PM (1=Yes)	0.127	0.334	0	1
PCTPM	Pct. PM in League	0.137	0.246	0	1
TREND	Trend (1876=0)	89.639	33.867	0	132
1B	First Base	0.063	0.243	0	1
2B	Second Base	0.066	0.249	0	1
3B	Third Base	0.063	0.243	0	1
C	Catcher	0.101	0.302	0	1
CF	Center Field	0.054	0.226	0	1
DH	Designated Hitter	0.013	0.114	0	1
LF	Left Field	0.067	0.250	0	1
OF	Outfield (General)	0.018	0.134	0	1
RF	Right Field	0.061	0.240	0	1
RP	Relief Pitcher	0.223	0.416	0	1
SP	Starting Pitcher	0.202	0.402	0	1
SS	Short Stop	0.063	0.244	0	1
AL	American League	0.478	0.499	0	1
FL	Federal League	0.004	0.063	0	1
NL	National League	0.505	0.499	0	1
PL	Player's League	0.001	0.034	0	1
UA	United Association	0.001	0.026	0	1
TR	Throws Right	0.804	0.396	0	1
BL	Bats Left	0.279	0.448	0	1
BR	Bats Right	0.643	0.479	0	1
Notes: 65,663 Observations describing 11,058 of professional baseball players from 1876-2008 for which complete data are available. 6,923 observations lost due to missing values for body mass index.					

Table 2b: Effect of Player Manager on Player Productivity (Random Effects Estimation Results)

Desc	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EXP	1.222***	1.221***	1.221***	1.209***	1.208***	1.208***	1.216***
	(0.0157)	(0.0157)	(0.0157)	(0.0157)	(0.0157)	(0.0157)	(0.0152)
EXPSQ	-0.0743***	-0.0741***	-0.0740***	-0.0740***	-0.0738***	-0.0738***	-0.0751***
	(0.00104)	(0.00104)	(0.00104)	(0.00104)	(0.00104)	(0.00104)	(0.00101)
BMI	0.448***	0.449***	0.449***	0.430***	0.430***	0.430***	
	(0.0199)	(0.0199)	(0.0199)	(0.0199)	(0.0198)	(0.0198)	
TEAMPM		-0.431***	-0.406***	-0.413***	-0.407***	-0.436***	-0.445***
		(0.0941)	(0.0951)	(0.0948)	(0.0948)	(0.103)	(0.0931)
PLAYERMGR			-0.706*	-3.046***	-3.129***	-3.137***	-2.372***
			(0.386)	(0.400)	(1.002)	(1.002)	(0.830)
EVERPM				5.451***	5.440***	5.430***	5.550***
				(0.253)	(0.253)	(0.253)	(0.221)
PMTREND					0.0430	0.0433	0.0259
					(0.0509)	(0.0509)	(0.0434)
PMTRENDSQ					-0.000810	-0.000810	-0.000685
					(0.000552)	(0.000552)	(0.000497)
PCTPM						0.147	0.396**
						(0.209)	(0.188)
TREND	-0.0319***	-0.0342***	-0.0342***	-0.0287***	-0.0287***	-0.0280***	-0.0203***
	(0.00108)	(0.00119)	(0.00119)	(0.00121)	(0.00121)	(0.00155)	(0.00143)
2B	0.166	0.159	0.152	0.117	0.114	0.113	-0.453***
	(0.173)	(0.173)	(0.173)	(0.172)	(0.172)	(0.172)	(0.164)
3B	0.0305	0.0295	0.0208	0.0296	0.0286	0.0282	-0.217
	(0.170)	(0.170)	(0.170)	(0.169)	(0.169)	(0.169)	(0.162)
C	-3.054***	-3.055***	-3.068***	-3.009***	-3.014***	-3.014***	-3.068***
	(0.163)	(0.163)	(0.163)	(0.163)	(0.162)	(0.162)	(0.157)
CF	1.875***	1.867***	1.860***	1.891***	1.891***	1.891***	1.586***
	(0.176)	(0.176)	(0.176)	(0.175)	(0.175)	(0.175)	(0.167)
DH	-2.742***	-2.741***	-2.754***	-2.689***	-2.683***	-2.685***	-2.636***
	(0.259)	(0.259)	(0.259)	(0.258)	(0.258)	(0.258)	(0.258)
LF	-0.274*	-0.283*	-0.293*	-0.187	-0.187	-0.187	-0.300*
	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)	(0.161)	(0.155)
OF	0.174	0.202	0.192	0.188	0.185	0.175	0.0161
	(0.241)	(0.241)	(0.241)	(0.240)	(0.240)	(0.240)	(0.240)
RF	0.342**	0.337**	0.327**	0.385**	0.384**	0.386**	0.143
	(0.166)	(0.166)	(0.166)	(0.165)	(0.165)	(0.165)	(0.159)
RP	-3.424***	-3.423***	-3.435***	-3.314***	-3.319***	-3.319***	-3.583***
	(0.142)	(0.142)	(0.142)	(0.142)	(0.141)	(0.141)	(0.136)
SP	0.890***	0.893***	0.880***	1.033***	1.032***	1.031***	0.964***
	(0.144)	(0.144)	(0.144)	(0.144)	(0.144)	(0.144)	(0.138)
SS	0.307*	0.302*	0.295*	0.235	0.234	0.234	-0.365**
	(0.179)	(0.179)	(0.179)	(0.178)	(0.178)	(0.178)	(0.168)
AL	-2.569***	-2.501***	-2.509***	-2.197***	-2.194***	-2.203***	-2.362***
	(0.284)	(0.284)	(0.284)	(0.283)	(0.283)	(0.284)	(0.244)

FL	-0.973**	-0.688	-0.684	-0.229	-0.250	-0.324	-0.399
	(0.492)	(0.496)	(0.496)	(0.494)	(0.495)	(0.506)	(0.450)
NL	-2.549***	-2.482***	-2.489***	-2.224***	-2.221***	-2.230***	-2.396***
	(0.281)	(0.281)	(0.281)	(0.281)	(0.281)	(0.281)	(0.241)
PL	-0.437	-0.187	-0.160	-0.205	-0.225	-0.278	-0.703
	(0.774)	(0.776)	(0.776)	(0.773)	(0.774)	(0.778)	(0.673)
UA	-2.803***	-2.676***	-2.664***	-2.490**	-2.502**	-2.537***	-2.128**
	(0.974)	(0.974)	(0.974)	(0.971)	(0.972)	(0.973)	(0.848)
TR	0.327***	0.329***	0.330***	0.321***	0.321***	0.321***	0.413***
	(0.110)	(0.110)	(0.110)	(0.109)	(0.109)	(0.109)	(0.106)
BL	0.0387	0.0333	0.0339	0.0578	0.0569	0.0579	0.136
	(0.149)	(0.149)	(0.149)	(0.148)	(0.148)	(0.148)	(0.144)
BR	-0.696***	-0.702***	-0.700***	-0.696***	-0.697***	-0.696***	-0.645***
	(0.135)	(0.135)	(0.135)	(0.134)	(0.134)	(0.134)	(0.131)
Constant	-1.057*	-0.870	-0.872	-1.289**	-1.292**	-1.354**	8.857***
	(0.599)	(0.600)	(0.600)	(0.598)	(0.597)	(0.604)	(0.320)
Observations	65663	65663	65663	65663	65663	65663	71998
No. of Players	11057	11057	11057	11057	11057	11057	12218
Notes: Data describe professional baseball players from 1876-2008. Last Specification drops body mass index and includes an additional 173 player manager observations. Estimates obtained including player-specific random effects. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1							

Figure 1: Player Mangers as a Percentage of All Managers

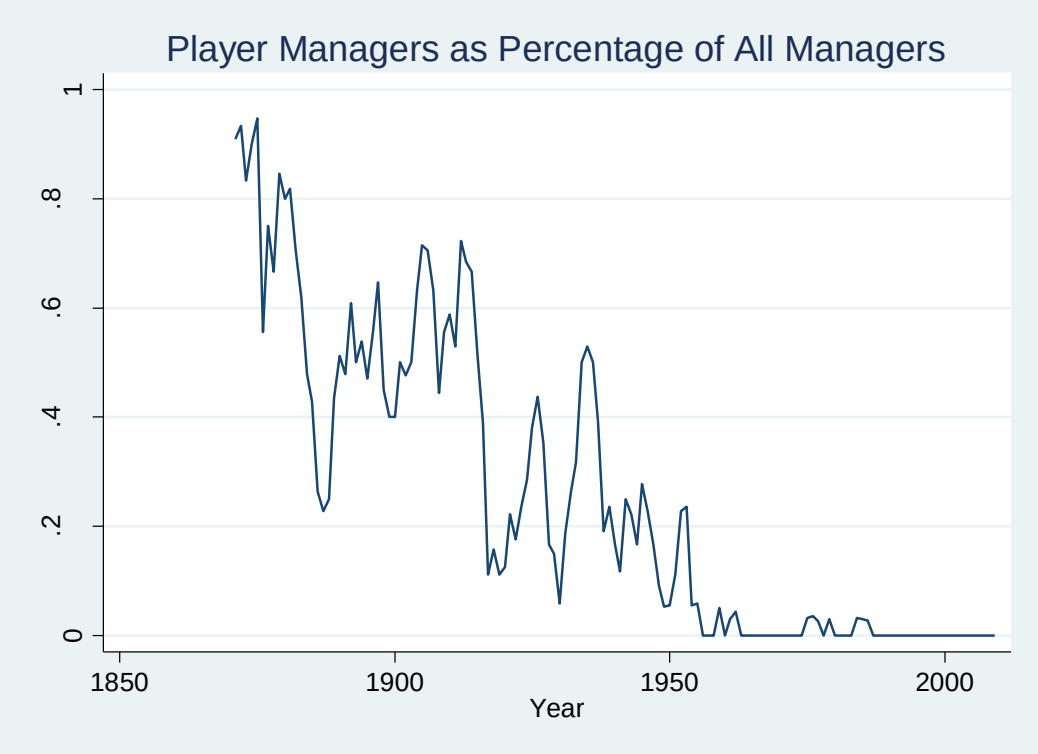


Figure 2: Impact of Being a Player Manager on Player-Manager Productivity

