The Effects of Roster Turnover on Demand in the National Basketball Association

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Abstract

The purpose of this study was to examine the effects of roster turnover on demand in the National Basketball Association (NBA) over a five-year period (2000-2005) and compare these results to previous research on turnover in Major League Baseball (MLB). A censored regression equation was developed to examine the relationship between roster turnover and season attendance, while controlling for other potentially confounding variables in the model. The censored regression model was used to account for the capacity constraints by forecasting the level of demand beyond capacity using information from the uncensored observations. The regression model was found to be significant with a log-likelihood statistic of 110.446. Previous attendance, current winning percentage, previous winning percentage, number of all-star players, and team history were found to be significant predictors of attendance. However, the variables measuring the effects of roster turnover were not found to be significant. There were substantial differences in the effect of roster turnover on attendance in the NBA compared with MLB. In addition, these findings provide evidence for using censored regression when dealing with constrained variables. Sellouts in the NBA appear to have an effect on all of the variables in the demand model. Future research will need to be conducted to help sport managers understand the role of roster turnover in specific professional leagues and to better understand the importance of using a censored regression model.

The Effects of Roster Turnover in the National Basketball Association

In the competitive world of the National Basketball Association (NBA), teams are trying to make player personnel moves through the draft, trades, and free agency in an effort to improve their roster. For example, the entire Boston Celtics roster turned over between 2003-04 and 2006-07, with just two exceptions, Paul Pierce and Kendrick Perkins. However, the team's winning percentage stayed around 40% (ESPN, 2007) during that time. Each year fans continue to attend games at the Fleet Center (capacity 18,624) to root for the Boston Celtics, even though a major portion of their roster has changed. Due to the high attendance figures at the Fleet Center, which had an average attendance of 16,364 from 2003-2006, (ESPN, 2007) the high player turnover rate, and the lack of an increase in on-court success, it appears fans are not discouraged by regular changes in team composition. Previous research suggests a fan's familiarity with the players on the home team should increase his or her enjoyment of the game and have a positive impact on attendance (Kahane & Shmanske, 1997). However, roster turnover continues to increase in the NBA as less successful teams attempt to emulate successful franchises in order to increase winning percentage and improve attendance figures (Nourayi, 2006). It is important to understand the potential effect this turnover has on the demand to attend NBA games.

One major factor affecting roster turnover is the implementation of free agency. The National Basketball Players Association (NBPA) won free agency in *Robertson v. NBA* (1975). In 1983, the NBA created a salary cap that is defined as a "soft cap" to help mitigate the concerns free agency created regarding competitive balance (Maxcy &

Mondello 2006).[1] According to Maxcy and Mondello (2006), "Sport enthusiasts expressed concern that competitive balance would diminish as star players congregated to large market cities. However, the economic invariance principle rejects this notion, indicating that balance should remain unchanged" (p.345). Rottenberg's (1956) invariance principle created the foundation for predicting the effects of league changes regarding free agency on player movement in professional sports. The invariance principle assumes that the system of free agency, which shifts the property right of the labor service from the owners to the players, will have no effect on the movement of talent and therefore will not have an effect on competitive balance. By sale or trade, players will be signed by teams in which they are most highly valued, or by marketing themselves as free agents.

It is believed the NBA is marketed as a "players' league" and star players are more marketable than teams (Gorman & Calhoun, 1994). Red Auerbach, former coach and 1993 president of the Boston Celtics, stated the importance of marquee players in smaller markets. However, all franchises desire athletes who possess marquee status. Marquee players change the chemistry between spectators and the team. Without marquee players, people attend games because of their interest in the sport (Gorman & Calhoun, 1994). According to Mark Tatum, senior vice president of marketing partnerships at the NBA, the advertising interest for Team USA was "tremendous" (even though TV ratings were miniscule). "A lot of the partners who signed up for USA Basketball also sponsor LeBron (James), Dwyane (Wade) and Carmelo (Anthony)," says Tatum. "For example, Coca-Cola and Gatorade are both USA Basketball sponsors, and

[1] A "soft cap" allows teams to match an offer for their free agent giving them the opportunity to keep the player. The majority of NBA teams actually spend more on player payroll than the "cap" amount.

each one has a relationship with Wade, Carmelo and James," (Ballard, 2006). According to John Cordova, Director, sports transaction management at Coca-Cola (2006), “Coke uses the NBA movie-star image to sell Sprite. Not a team image.”

Last season Dwyane Wade's and LeBron James' replica jerseys ranked first and second in sales. The perceived importance of specific players in the NBA adds further evidence to the notion that excessive player movement and roster turnover may have an impact on demand.

Purpose of the Study

The purpose of this study was to develop a model to measure the effect on demand due to the roster turnover and change to the composition of NBA teams. There is limited empirical information on the effects of roster turnover on demand in professional sports (Kahane & Shmanske, 1997). It is important to understand the impact player movement can have on attendance, since ticket sales are a major revenue stream for professional teams. Gate receipts in the NBA and the National Hockey League (NHL) are the single greatest source of income (Howard & Crompton, 2004). In addition, roster turnover has only been examined in Major League Baseball. This variable may have different effects on different leagues and sports. For example, Branvold, Pan, and Gabert (1997) found population had a significant impact on attendance at lower levels of minor league baseball, but the impact was not significant at higher levels. Findings in the majority of demand studies differ by sport and level of play (Shackelford & Greenwell, 2005). Therefore, the demographic makeup, spectator/fan interaction, and franchise locations may be unique to each sport and each league.

The model incorporates additional variables based on previous literature to help explain a significant portion of the variation in NBA attendance. Initially, both OLS and censored regression techniques were used to explain the variability in NBA attendance. However, censored regression takes into consideration the capacity constraints on attendance, and therefore it was the most appropriate model when examining the NBA where sellouts are common.

Review of Related Literature

Traditional Factors Affecting Demand

There has been a variety of research conducted on the factors that affect attendance at sporting events. The majority of these studies have focused on major league baseball (Baade & Tiehen, 1990; Greenstein, & Marcum, 1981; Kahane & Shmanske, 1997; McEvoy, Nagel, DeSchriver, & Brown, 2005; Noll, 1974; Rivers & DeSchriver, 2002). However, there have been studies done in professional football (Noll, 1974; Hanson & Gauthier, 1989), college football (DeSchriver, 1999; Jenson & DeSchriver, 2002), college basketball (McEvoy & Morse, 2007), professional basketball (Burdekin & Idson, 1991; Noll, 1974; Pease & Zhang, 2001; Whitney, 1988; Zhang, Pease, Hui, Michund, 1995), and professional hockey (Hanson & Gauthier, 1989;; Zhang, Pease, Lee, Lam, Smith, & Jambor, 1997).

Noll's (1974) examination of factors that influence demand was the seminal work in this area. Noll's study of baseball, basketball, football, and hockey found that team quality, ticket price, number of star players, population, and per capita income were all significant factors in determining attendance. Other recent studies have had similar results analyzing the effects of the variables previously mentioned (Deschriver, 1999;

Jenson & DeSchriver, 2002; Pan, Zhu, Gabert, & Brown, 1999). Pan et al. (1999) analyzed the effects on major league baseball attendance through the use of panel data. The researchers concluded that stadium size should be based on specific market characteristics to create demand.

Several themes have emerged from the literature in this area. According to the majority of models, team quality characteristics (i.e. winning percentage, games back in the standings, championships, and playoff appearances), population, per capita income, stadium age, stadium capacity, and ticket price are significant determinants of attendance. The importance of the previously mentioned variables is well documented. However, there has been limited research on the impact of team composition and roster turnover on attendance.

Player Composition Affects on Demand

Burdekin and Idson (1991), in their study of team racial composition in the NBA, found there was an increase in attendance when the racial composition of the team matched that of the community. The empirical findings showed that racial composition of a certain population would have strong influence on the structure of the team roster. The ratio of white players on the team to that in the population exerts a significantly positive effect on attendance. In addition, the results suggest that it is the racial composition of the starters that have a significant impact on attendance.

Results of the regression models support the primary hypothesis that the link between racial structure of teams and racial structure of team market areas may be logical in terms of profit maximization. This study was not designed to analyze the difference in roster turnover or player change. However, the results still show that the roster

composition does have an effect on demand. This study provides strong support for consumer preferences helping to shape the composition of teams in the NBA. Future studies regarding player composition can provide further evidence of the impact team composition has on attendance. In addition, it is important to understand if regular changes in team composition have any effect on demand in the NBA.

Rivers and DeSchriver (2002) studied the effect of star players and payroll distribution on attendance. The authors found that a star player must have made a significant contribution to their team in the current year in order to have a significant effect on attendance. Those star players who do not impact team success in a given year will have little or no effect on attendance. In addition, the authors found that higher payroll will significantly increase attendance. However, the relationship between intra-team payroll variation and attendance was negative. The results suggest Major League Baseball teams with a more balanced payroll distribution have better attendance than those who pay one or two players most of the team payroll. Star players may increase season ticket sales in the short term. However, in the long term a more balanced roster will positively impact attendance. Previous studies (Noll, 1974; Whitney, 1988) have proven a strong relationship between on-field success and attendance. When the balance of the payroll distribution shifts to one or two players this can decrease the winning percentage and create a negative effect on attendance.

Nourayi's (2006) examination of profitability and the NBA used benchmarking methods to compare measures for a group of "inferior" NBA teams with those of the top performing teams in the league. The purpose of such comparisons was to identify team attributes that help a team increase their winning percentage. Due to the fact a team's

performance depends on players and coaching staff, processes such as players and coaching personnel selections greatly influence long-term strategic concerns. These concerns include support of local businesses and government, and stability of the franchise. Results of this study indicate that based on team winning percentage significantly impacting attendance, it is most profitable for NBA teams to make roster changes in an effort to improve overall team performance. This will increase attendance and profitability over time.

There is only one previous study that focused specifically on the effects of roster turnover on attendance. Kahane and Shmanske (1997) examined roster turnover effects in MLB. The results showed that winning percentage had a positive impact on attendance. An extra percentage point in a team's winning percentage increased annual attendance by about 32,000 fans in the current year and 25,000 fans the following year. Income, population, and a new stadium were also found to positively impact attendance. Ticket price was found to have a negative effect on attendance.

The main variable of interest, roster turnover, was measured in two distinct ways. Player turnover focused on the percentage of players on the team who played in 60% of games in a given season, and were not on the roster the following season. Payroll turnover measured the percentage of payroll leaving the team from one season to the next. Both of these variables were found to have a significantly negative effect on attendance. Teams lose, on average, 27% of their players each year. For each percentage point loss, yearly attendance decreases by about 6,000 to 12,000 fans. In addition, the loss of a productive player (without the gain of an equally or more productive player) will

lead to a decrease in team quality factors. This will ultimately have a further negative effect on attendance.

The Kahane and Shmanske (1997) study focused specifically on roster turnover in Major League Baseball. There has not been any research conducted to examine the importance of this variable in other leagues. The fan bases for different sports and leagues may have unique characteristics. The variables that affect demand in Major League Baseball may have a different impact in other professional sports. An examination of the impact roster turnover has on demand in other leagues will help sport managers gain a more complete understanding of the effect of player movement.

Methodology

The Demand Model

A demand model was used to measure the effect of roster turnover on demand in the NBA. The model was created through an analysis of the previous literature on the factors that affect demand. In addition to roster turnover, ten explanatory variables were used to control for other factors that may impact the variability of attendance in the NBA.

This model is unique compared to previous models that have examined the factors that affect demand in the NBA by focusing on the impact of roster turnover. The following section defines the dependent variable, the variable of interest (roster turnover), and each of the ten explanatory variables that make up the model.

Dependent Variable

Attendance (ATTEND) – The total annual attendance at home games for each of the 30 NBA teams that were in the league from the 2000-2001 season to the 2004-2005 season.

Variable of Interest

Roster Turnover – The main variable of interest was measured in two distinct ways based on the previous work of Kahane and Shmanske (1997) in Major League Baseball. Player Turnover (PTURNOVER) measured the percentage of players on a team who played in 60% of games in a given season, and were not on the roster the following season. Initially, player turnover was broken into two variables. One variable measured total roster turnover and the other variable only looked at roster turnover from players that appeared in at least 60% of games. There was no significant difference in the impact of these variables, so the 60% cutoff was implemented to highlight the impact of turnover from the players that regularly appeared in games during a given season, and to compare the results to the previous study on MLB.

Salary Turnover (STURNOVER) measured turnover as the proportion of a team's payroll that does not return the next season. This variable essentially weighted players based on their salary to determine the turnover impact of significant shifts in payroll from season to season. It allows for the estimate of turnover for higher quality players (proxied by salary). The use of these two variables helps further explain any impact roster turnover may have on demand.

Explanatory Variables

1. Previous Year's Attendance (PREVATT) – A lagged attendance measure to capture the change in attendance from one season to the next. It is important to understand how roster turnover affects this change for a franchise from one season to the next.

2. Current Season Winning Percentage (CURWIN) - The winning percentage for a team in a given season. Current winning percentage has been shown to have a positive relationship with attendance (Kahane & Shmanske, 1997; Noll, 1974; Scully, 1974).

3. Previous Winning Percentage (PREVWIN) - The winning percentage for a given team in the previous season. The winning percentage for a team in a previous season can also have an effect on the current season's attendance due to the fact that fans identify the recent performance of a team and relate that to current success. Previous winning percentage has been shown to have a positive relationship with attendance (McEvoy, Nagel, DeSchriver, & Brown, 2005; Kahane & Shmanske, 1997).

4. All-Star Players (ALLSTAR) – The number of players on a given team that made the all-star game in the previous season. Rivers and DeSchriver (2002) found that a player that has made a significant contribution to a team will positively affect attendance. Fans can be attracted to the status of specific players in addition to the overall success of the team.

5. History (HIST) – The number of league championships a team has won over the history of the franchise. Many teams have a tradition of success that is acknowledged by fans. It is important to understand the impact of a team's history of success on attendance.

6. Population (POP) – The population, as reported by the U.S. Census Bureau, of the county where a team plays. This variable has been used in numerous demand studies (Baade & Tiehen, 1990; Kahane & Shmanske, 1997; Pan, et al., 1999). Population is expected to have a positive effect on attendance as teams in larger markets have more potential customers.

7. Per Capita Income (INCOME) – Per Capita income was used to measure potential purchasing power in a team's area. The effect of per capita income has been mixed in previous demand studies. However, it has been shown to have an impact on attendance (Baade & Tiehen, 1990; Kahane & Shmanske, 1997; Noll, 1974; Scully, 1974).

8. Average Ticket Price (TIXPRICE) – The average ticket price for a game in a given season. The majority of demand studies have used some form of ticket pricing to examine its effect on attendance (Kahane & Shmanske, 1997; McEvoy et al., 2005; Noll, 1974; Pan, Zhu, Gabert, & Brown, 1999; Scully, 1974).

9. New Arena (ARENA) - A dummy variable that was equal to one if the arena had been built in the past five years. Previous studies have found that a new arena or stadium has a positive effect on attendance (Kahane & Shmanske, 1997; McEvoy et al., 2005; Noll, 1974).

10. Conference Affiliation (CONF) – A dummy variable was used to differentiate between the Eastern and Western Conferences in the NBA.

11. Division Affiliation (DIV) – A dummy variable was used to identify the division that a specific team competes in. There are divisional rivalries and certain divisions that are more competitive in the NBA. This factor may also have an impact on attendance.

Sample

Data were collected for five seasons (2000-2001 to 2004-2005) on each team that competed in the National Basketball Association. Due to data limitations, the Charlotte Bobcats were omitted from the data set (the team's first year of competition was 2004-2005). Also, only two years of data were used for the New Orleans Hornets (they competed in Charlotte during the 2000-2001 and 2001-2002 seasons) and only three

years of data were used for the Memphis Grizzlies (they competed in Vancouver during the 2000-2001 season). The Eastern Conference had a higher average total season attendance during the five years examined (699,969 average season attendance). In addition, the Central Division of the Eastern Conference had the highest average season attendance of any division during the five years examined (727,307 average season attendance). Overall, the sample size was $N = 140$.

Procedures

Data on the variables in the demand model were collected from a variety of sources. Attendance data was collected from ESPN.com and NBAhoopsonline.com. Both roster turnover and salary turnover data were collected from ESPN.com and USAToday.com. Winning percentages (both current and previous), all-star appearances, team history, league and conference affiliation, and arena age data were all collected from ESPN.com and NBA.com. Ticket price data was collected from NBA.com. Population and per capita income data were both collected from the U.S. Census Bureau.

Statistical Design

A multiple linear regression equation was developed to examine the relationship between roster turnover and season attendance, while controlling for other potentially confounding variables in the model. Initially, a variety of different regression equations were tested to generate the best fitting model. Due to the nature of NBA demand there are a number of sellouts. During the five NBA seasons examined, there were eighteen occasions where a team sold out all of its home games for the entire season. In these situations, the level of demand can be higher than attendance. However, due to the capacity constraints, the actual level of demand cannot be measured. Ordinary least

squares (OLS) regression measures the variability of attendance explained by the model. However, OLS regression assumes that there are no constraints on any of the variables. Sellouts are common in the NBA and the capacity of a stadium can prevent the true level of demand from being explained. Sellouts imply that the level of demand was higher than the capacity of the stadium (Rascher, McEvoy, Nagel, & Brown, 2007). Through the use of censored regression, the empirical model can forecast the level of demand above and beyond the capacity constraints of NBA arenas. The censored regression model takes into consideration the capacity constraints by forecasting the level of demand beyond capacity using information from both the uncensored variables and seasons that were not sold out. Censored regression can provide a better understanding of the relationship between roster turnover and attendance in the NBA, and therefore it was the optimal model for this analysis.

All of the multiple linear regression assumptions (Linearity, Independence, Normality, and Equality of Variances) were examined. Descriptive statistics, residual plots, and statistical tests for normality and equality of variances showed that none of the assumptions were violated in the regression equation. In addition, potential multicollinearity issues within the model were examined. Both variance inflation factors and tolerance statistics were examined for multicollinearity issues. The results suggested there were no multicollinearity issues in either of the final regression equations used in the analysis. A significance level of 0.05 was established *a priori* in analyzing the regression models and related variable correlations.

Results

Table 1 provides the descriptive data for all thirteen of the variables used in the regression equation. The results showed that the NBA teams sampled between the 2000-2001 and 2004-2005 seasons had an average total home attendance of 700,086 with a standard deviation of 92,707. There was a small degree of variability in the sample compared to similar demand studies in other professional sports. On average, about one-third of teams' rosters changed each season. The average player turnover of 36.2% and average salary turnover of 36.7% were almost identical. Interestingly, there were instances where a team did not have any turnover and where a team had over 88% of their roster change.

Other important descriptive findings included average population, per capita income, and ticket price. The average population in the sample was 2,902,189 with a mean per capita income of $24,612. The average ticket price of all games in the sample was $45.76. Finally, the average amount of all-star players on the teams sampled was 0.75.

Table 2 provides correlational data for each of the independent variables in the study and attendance. Seven of the thirteen independent variables were significantly correlated to attendance at the 0.05 level. The independent variables that correlated most strongly with attendance were previous attendance (r= .787), current team winning percentage (r= .391), previous team winning percentage (r=.339), and number of all-star players on the roster (r=.336). It is important to note that neither measurements for roster turnover (player turnover and salary turnover) were significantly correlated with attendance.

Censored Regression

Table 3 summarizes the results from the censored regression analysis. Out of 140 observations, only 18 teams completely sold out all of their home games in a given year. The estimate of attendance for these 18 observations is based on the predicted values from the censored regression. The censored regression model was found to be significant. The log-likelihood statistic was 110.446.

As displayed in Table 3, the variables PREVATT (p = <.001), CURWIN (p = <.001), PREVWIN (p = .028), ALLSTAR (p = .029) and HIST (p = .017) were found to be a significant variables within the censored regression model. The variable ARENA (p= .064) was found to be marginally significant. All of these variables had a positive relationship on attendance. Previous attendance explained the most variability in attendance. This was expected due to the high correlation between current and previous attendance. It was an important variable in the model because it helped to examine the affect of roster turnover on the change in attendance from year to year. Current winning percentage and previous winning percentage were positively related to attendance as expected. An interesting finding was the significance of the all-star variable. It appears that the number of all-stars from the previous year that stay on the roster positively affects attendance. Finally, team history appeared to have a positive impact on attendance. The tradition built over time through NBA championships appears to have an effect on attendance.

Both the player turnover and roster turnover variables were not significant in the model. In general, the findings support the notion that roster turnover did not have a significant effect on attendance in the sample examined. This is contradictory to the

results in the previous MLB study. Taking the capacity constraints into account may have had an effect on the amount of variability explained by roster turnover in the censored regression model. Finally, other control variables such as population, income, and ticket price were not found to be statistically significant in the model. These variables were all found to be significant in the MLB model. These variables appeared to play a minor role in determining attendance in the NBA.

Discussion

The purpose of this study was to develop a model to measure the effect on demand due to roster turnover and changes in the composition of NBA teams. The model incorporates additional variables based on previous literature to help explain a significant portion of the variation in NBA attendance. Current winning percentage, previous winning percentage, attendance from the previous year, the number of all-stars on the roster, and the championship history of the organization were all found to be significant predictors of attendance in the model. However, this study's results did not support the findings of previous research in terms of player movement. The main variable of interest, roster turnover, was not found to be a significant predictor of attendance. This was contradictory to Kahane and Schmanske's (1997) previous study on roster turnover in MLB. In addition, a censored regression model was used to account for capacity constraints. The censored regression equation may have accounted for some of the differences in findings from previous studies.

Roster Turnover Effects

Both variables used to measure the effect of roster turnover on demand in the NBA were found to be statistically insignificant. Contrary to popular opinion, the

findings showed a distinct difference in the effect of roster turnover in the NBA in comparison to MLB. This difference can be attributed to various factors. One possible explanation for the difference between the MLB study and the NBA study is the fact that consumer motivation and fan base may differ from one professional league to another. Baseball is known to have a strong tradition and rich history. Some baseball fans have a purist mentality and may be negatively affected by the aspect of player movement. The sociodemographic variables and internal motivation to attend sporting events tends to vary across different sports as well. Spectators will have motivations to attend sporting events based on their individual preferences, experiences, and values (Wann, Schrader, & Wilson, 1999).

This study provides evidence that demand for the NBA is not necessarily affected by player movement provided the team continues to have success. NBA fans may be more willing to except roster changes in the interest of winning, where MLB fans may have a stronger affinity for specific players. Ultimately, leagues and individual teams must have a complete understanding of the unique sociodemographic makeup and attitudes of their fans in relation to player movement in order to market their team effectively.

Another possible explanation is the effect of the economic invariance principle on the NBA. Despite a team losing a star player, the economic invariance principle explains that a star player will be replaced by a player or players of similar salary and abilities. In most cases, teams change their roster to improve the overall quality of their team (Nourayi, 2006). If fans believe that current player movement is done in an effort to improve the team, they may look more favorably upon roster turnover. A player that fans

appreciate may leave the team, but if a more talented player replaces him, then fans may accept the move. This notion supports Nourayi's (2006) findings that less successful NBA teams make roster changes in an effort to emulate the most successful teams. Player movement through trades could be seen as a positive organizational move and therefore appreciated by those who support the team.

This type of roster turnover is an attempt to increase the team's winning percentage. This study shows that winning percentage has a significantly positive effect on demand at NBA games. The findings support this notion by the fact that the all-star variable was found to have significantly positive effect on attendance as well. The general player movement may not have an impact on fans' decisions to attend NBA games. However, players that make a major contribution to the team can affect demand. This is supported by Rivers and Deshriver (2002), in which a star player who makes a contribution that increases the team's on-field performance will have a significantly positive impact on attendance.

In addition, players on a current roster are generally known, where new players are exciting and the possibilities for winning become greater in the minds of fans. Unless a team has won a championship there is room for improvement. Therefore, any change in roster might spark the interest of fans and make them more likely to attend games in order to evaluate the new players on the roster and the overall success of the team.

A third possible explanation for this finding is that fans have become more accustomed to the increase in player movement (Sanderson & Siegfried, 1997), which de-emphasizes the importance of roster continuity. Sanderson and Siegfried note that professional leagues with draft systems could take advantage of players with regional

popularity, however they choose not to. Their conclusions provide further evidence that ownership is motivated by winning rather than individual player popularity. This could be the result of free agency in the market place. In Maxcy and Mondello's (2006) study on competitive balance in Major League baseball it was confirmed that free agency had increased the rate of roster turnover while also improving some aspects of competitive balance.

Censored Regression Model

The use of censored regression may have also accounted for the findings. The majority of demand models in relation to sport attendance do not use a censored regression model to account for capacity constraints. Sellouts will decrease the amount of variability in attendance because demand may be higher than the capacity of certain arenas. The censored regression model estimates the level of demand beyond the capacity constraints and therefore is likely to have an effect on all variables in the model. An examination of this model by using an OLS regression equation did not change the significance of roster turnover. However, there were only 18 sellouts in the sample examined. Additional samples may have a greater affect on the results of the censored regression model. It is important to understand the impact that the censored regression model can have in situations that warrant its use.

Limitations

A primary limitation of this study is the lack of generalizability beyond the population of the NBA basketball games played during the 2000-2001 to 2004-2005 seasons. The results of this study cannot be generalized beyond this group of subjects without raising external validity concerns. Second, time must be considered when

compared to the previous study conducted in MLB. Cultural changes in society along with changes in league rules may impact consumer behavior, which can alter results. Fans have become more comfortable with player movement over time (Sanderson & Siegfried, 1997) and this may have a considerable impact on attendance.

Implications for practitioners

Professional sports are revenue-motivated organizations in a competitive entertainment industry. Mullin, Hardy, and Sutton (1993) indicated that professional sports executives manage their business in much the same way as corporate executives. From a player composition standpoint, professional team executives will always attempt to put a roster together that will increase winning percentage which has been shown to increase demand. In the NBA specifically, team success has a stronger impact on fan support than team composition. The results of this study can help practitioners that are trying to make player personnel moves through the draft, trades, and free agency in an effort to improve their roster. It is important to understand the potential affect this turnover has on the demand to attend games. When an organization is improving the talent level on their roster they must find players that are the best fit on the court and not worry about how player movement affects fan loyalty.

Directions for future research

There are a number of areas that warrant further investigation on the topic of roster turnover and demand. First, the results from the regression equations show the variables that impact demand in the NBA. However, this quantitative analysis was not able to explain why fans choose to attend NBA games. A better understanding of why

this occurred could be of great benefit to practitioners. This determination likely requires both qualitative and quantitative investigation of consumer behavior in this regard.

Another finding needing further examination was the differences in fan characteristics between leagues. A comparison of variables that impact demand between leagues will create a better understanding of the factors that have the most influence on attendance. In addition, testing the model in different leagues will enhance the validity of the instrument across different samples.

Finally, roster turnover must continue to be studied in different sports over different time periods. The impact of player movement and the importance of roster continuity are not completely understood. A future study could differentiate between roster turnover through free agency versus a trade. Perhaps losing players to free agency as opposed to a trade has a differentiable effect. Free agency may feel like a loss of control to the fans, but purposefully trading players to get other ones might be looked at more favorably. Further examination of player movement will help practitioners understand the attachment between players and fans. In addition, future research will help sport managers understand the role of roster turnover in specific professional leagues. Marketing strategies can then be tailored to account for this unique variable and maximize revenue to benefit the overall organization.

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Table 1 Descriptive Statistics

Variable	*Variable Description*	*Mean*	*Standard Deviation*	*Minimum*	*Maximum*
ATTEN	Game attendance	700086	92707	471374	913176
PTURNOVR	Player turnover	.362	.187	0	.889
STURNOVR	Salary turnover	.367	.207	.009	.985
PREVATT	Previous Years Attendance	694952	96740	471374	913176
CURWIN	Current winning %	.506	.144	.159	.756
PREVWIN	Winning % from the previous year	.504	147	.183	.817
ALLSTAR	# of all-stars on roster	.757	.785	.0	3
HIST	# of championships	2.11	3.89	0	16
POP	Home team's county population	2902189	2469741	572059	9519338
INCOME	Home team's county per capita income	24612	5110	18400	42922
TIXPRICE	Average ticket price	45.77	11.88	26.38	91.15

Note: n = 140

Table 2 Variable Correlations with Attendance

Variable	*Attendance*
PTURNOVR	-.072
STURNOVR	-.047
PREVATT	.789*
ALLSTAR	.336*
CURWIN	.391*
PREVWIN	.340*
HIST	.170*
POP	.293*
INCOME	.058
TIXPRICE	.178*
CONF	-.001
DIV	-.106
ARENA	-.100

Note: * Correlation is significant at the .05 level. n=140

Table 3 Censored Regression Results (Dependent Variable = Season Attendance)

Variable	*Estimate*	*Standard Error*	*Chi-Square statistic*	*P-value*
PTURNOVR	-.0507	.0597	.72	.3965
STURNOVR	.0755	.0489	2.37	.1226
PREVATT	<.001	.0000	117.45	<.0001
CURWIN	.3344	.0689	23.57	<.0001
PREVWIN	.1678	.0763	4.83	.0279
ALLSTAR	.0282	.0130	4.74	.0294
HIST	.0056	.0023	5.74	.0166
POP	<.001	.0000	.68	.4104
INCOME	<.001	.0000	.37	.5429
TIXPRICE	.0006	.0009	.40	.5292
CONF	-.0146	.0442	.11	.7413
DIV	.0364	.0528	.47	.4914
ARENA	.0550	.0297	3.43	.0639

Note: There were 18-censored observations in the sample.