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The Short Supply of Tall People: Competitive Imbalance and the National Basketball Association

David J. Berri,
Stacey L. Brook,
Bernd Frick,
Aju J. Fenn,
and
Roberto Vicente-Mayoral

In recent years a wealth of literature has been offered examining the economics of professional team sports. Much of this work follows in the neoclassical tradition, employing the standard assumptions and focusing primarily on the impact of individual decision making. The purpose of this work is to show that the blinders imposed by the narrow focus of the neoclassical tradition on the issue of competitive imbalance may alter the conclusions that a broader view suggests.

Economists from the time of Adam Smith have trumpeted the virtues of competition. From the perspective of individual firms, though, profits are typically increased when competition is eliminated. However, in professional sports, the elimination of competition effectively removes the primary source of revenue. In the words of Walter Neale, "Pure monopoly is a disaster. [Former heavy-weight champion] Joe Louis would have had no one to fight and therefore no income" (1964, 2).

The analysis of Neale extends beyond the obvious case of the boxing champion to any professional sport. As noted by Mohamed El-Hodiri and James Quirk (1971, 1306),

David J. Berri is Associate Professor of Economics in the Department of Economics at California State University–Bakersfield; Stacey L. Brook is Associate Professor of Economics in the Vucurevich School of Business at the University of Sioux Falls, South Dakota; Bernd Frick is Professor of Economics in the Department of Economics at the University of Witten/Herdecke, Germany; Aju J. Fenn is Assistant Professor of Economics in the Department of Economics and Business at The Colorado College, Colorado Springs, Colorado; and Roberto Vicente-Mayoral is Assistant Director of Research at the National Collegiate Athletic Association, Indianapolis, Indiana. *The authors would like to acknowledge the insightful comments of Jim Peach. They acknowledge any errors as their responsibility.*

"[t]he essential economic fact concerning professional team sports is that gate receipts depend crucially on the uncertainty of outcome of the games played within the league. As the probability of either team winning approaches 1, gate receipts fall substantially. Consequently, every team has an economic motive for not becoming "too" superior in playing talent compared with other teams in the league."

Following the above-cited works, one could conclude that an important element of the economic success of a professional sport is the reduction of competitive imbalance.[1] Whenever one competitor reaches a level of dominance where uncertainty of outcome has been compromised, the demand for the output of this industry is expected to decline. Such a result has been noted empirically by Glenn Knowles, Keith Sherony, and Haupert (1992) and by Daniel Rascher (1999). Each of these authors noted that fan attendance in Major League Baseball is maximized when the probability of the home team winning is approximately 0.6. If the home team has a higher probability of finding success, one can expect fan attendance to decline. Consequently, given the importance of fan attendance to a league's financial success, leagues are expected to implement rules and institutions designed to address the relative strength of combatants on the field of play.

The focus of the literature exploring sports and competitive imbalance is often upon the variety of institutions individual leagues have enacted to improve the distribution of wins within the league. These include the reserve clause, the rookie draft, revenue sharing, and payroll caps.[2] The presumption behind the enactment of each of these institutions is that the level of competition is a factor within the reach of league policy.

Much of this literature focuses upon the investigation of competitive imbalance in a single sport, such as baseball or basketball. If one adopts a broader view, though, the picture one paints differs from much of this prior work. We will begin our "painting" with an analysis of competitive imbalance across a wide array of professional team sports. This will be followed by a discussion of the causes of competitive imbalance, a discussion that will lean heavily upon the works of evolutionary biologist Stephen Jay Gould. From our discussion of Gould we will turn to the specific case of professional basketball. This discussion will center upon the supposed "short supply of tall people," a factor that we believe drives the persistent level of competitive imbalance found in the NBA.

Measuring Competitive Imbalance

To explore the level of competitive imbalance across a variety of professional team sports we require a measure of the dispersion of wins in a league that allows intersport comparisons.[3] As noted, most studies have focused upon one sport. The exception to this trend lies in the work of Quirk and Rodney Fort (1997), who sought to compare the level of competitive imbalance in Major League Baseball, the National Football League, the National Basketball Association, and the National Hockey League. To make comparisons across sports, these authors turned to the earlier work of Roger Noll (1988) and Gerald Scully (1989). Both Noll and Scully argued that the dispersion of wins could be measured by comparing "the actual performance of a league to the performance that would have occurred if the league had the maximum degree of competitive balance in the sense that all teams were equal in playing strengths. The less the deviation of actual league performance from that of the ideal league, the greater is the degree of competitive balance" (Quirk and Fort 1997, 244).

The above intuition suggests the measure of competitive balance (CB_{it}) reported in equation (1).

$$CB_{it} = \frac{\sigma(wp)_{it}^{actual}}{\sigma(wp)_{it}^{ideal}} \text{ where } \sigma_{it}^{ideal} = \frac{\mu(wp)_{it}}{\sqrt{N}} \tag{1}$$

Specifically, $\sigma(wp)_{it}$ is the standard deviation of winning percentages (or team points for leagues in which ties are possible) within league (i) in period (t). This is compared with the idealized standard deviation, which is defined by Quirk and Fort as the standard deviation of winning percentage if each team in a league has an equal probability of winning. The greater the actual standard deviation is relative to the ideal, the less balance exists within the professional sports league. The calculation of the idealized standard deviation employs both the mean winning percentage[4] in the league $\mu(wp)_{it}$ and the total number of regular season games played (N). Quirk and Fort argued that the above measure allows for intersport comparisons because it controls for the differing schedule lengths of professional sports leagues.

Utilizing the Noll-Scully competitive balance measure, we examined a sample of seventeen professional sports leagues in the sports of soccer (or football), American football, hockey, baseball, and basketball. The specific leagues are listed in table 1.

For each of the listed leagues we began with the final regular season standings. We then examined the dispersion of regular season winning percentage, via equation (1), to ascertain the level of competitive balance that existed within the league.[5] With respect to most of the leagues listed in table 1, our sample includes the entire history of each league through 2003. The exceptions to this rule are the European soccer leagues (French Ligue 1, Spanish Primera Division, German Bundesliga 1, Italian Serie A, and English Premier League), where our sample begins in 1976.

The leagues are listed in table 1 according to sport played. The sports are listed in terms of the general level of competitive balance, with each league ranked in each sport according to the average level of balance achieved. For example, the most competitive sport is generally soccer. Within soccer, the most competitive leagues have been the MLS and NASL, although virtually every soccer league has achieved a greater level of balance than the next sport, American football.

While there is some overlap across the two sports of soccer and American football, the surprising level of consistency within each sport is of interest. The Noll-Scully mea-

Table 1. Competitive Imbalance for a Sample of Professional Team Sports

League	Label	Sport	Years	Number of Observations	Average Level of Competitive Balance
Major League Soccer	MLS	Soccer	1996-2003	8	1.281
North American Soccer League	NASL	Soccer	1967-1984	18	1.341
French Ligue 1	FL1	Soccer	1976-2003	28	1.391
Spanish Primera Division	SPD	Soccer	1976-2003	28	1.403
German Bundesliga 1	GB1	Soccer	1976-2003	28	1.424
Italian Serie A	ISA	Soccer	1976-2003	28	1.554
English Premier League	EPL	Soccer	1976-2003	28	1.581
Canadian Football League	CFL	Football	1960-2003	41	1.481
Arena Football League	AFL II	Football	1987-2003	17	1.561
National Football League	NFL	Football	1922-2003	82	1.562
American Football League	AFL I	Football	1960-1969	10	1.578
National Hockey League	NHL	Hockey	1917-18 to 2002-03	86	1.850
World Hockey Association	WHA	Hockey	1972-73 to 1978-79	7	1.891
National League	NL	Baseball	1901-2003	103	2.072
American League	AL	Baseball	1901-2003	103	2.129
National Basketball Association	NBA	Basketball	1946-47 to 2002-03	57	2.542
American Basketball Association	ABA	Basketball	1967-68 to 1975-76	9	2.601

sure of average competitive balance in soccer ranges from 1.281 to 1.581. For American football the range is even tighter, 1.484 to 1.578. Both hockey leagues offer a level of competitive balance that is close to 1.9. On average, baseball and basketball offer a standard deviation of winning percentage that is more than twice the idealized level. Such rudimentary analysis suggests that the level of competitive balance or imbalance is primarily a function of the sport being played.[6]

Evolutionary Biology and Competitive Imbalance

Why would the sport played dictate the level of competitive imbalance? The answer lies in an unexpected place, the work of Gould (1983, 1986, 1996). People had speculated that the disappearance of the 0.400 hitter in baseball was due to a decline in the overall level of talent. Gould took the opposite point of view. He began his argument with the observation that there exists a biomechanical limit to the athletic ability of a human being. Although an elite athlete might be able to run 100 meters in slightly less than ten seconds, no amount of training will reduce this time to less than five seconds. The design of the human body simply does not allow such speeds.

In the initial years of any athletic competition, the competitors on the field will be relatively diverse. A small number of athletes will be close to the biomechanical limits. Many players, though, will possess far less ability. Given this varied distribution of talent, one can expect those in the far right of the distribution to post performances far above the mean. As Gould noted, in baseball the mean batting average of 0.260 was relatively constant throughout the twentieth century. In the first half of the century, though, when the available population of athletes was relatively small, the standard deviation was relatively large and there existed players who could hit 0.400 or higher. As the population of baseball players expanded, due to the integration of African-Americans and the influx of foreign talent, the number of players approaching the biomechanical limits increased. Hence, the distribution of talent narrowed, the standard deviation of performance fell, and the 0.400 hitter vanished from the scene.

A similar argument applies to the study of competitive imbalance. A league where the level of talent consists of players of varying ability will likely have a fair amount of imbalance. In such a league, lesser players will often be competing against players with a higher level of skill. As the amount of talent closer to the biomechanical limit increases, the distribution of wins should improve. The work of Martin Schmidt and David Berri (2003) offers evidence consistent with this expectation. These authors examined the relationship between the dispersion of wins in Major League Baseball and two factors, the pace of racial integration and the rate at which foreign talent was employed by the league. Consistent with the supposition of Gould, as the population of talent expanded, the level of competitive imbalance was reduced. In fact, after controlling for changes in the population base, factors such as the introduction of the rookie draft and the ending of the reserve clause were found to have very little impact on the distribution of wins in Major League Baseball.[7] A similar result, reported in Schmidt and Berri 2004, was uncovered with respect to the distribution of individual talent. Changes in the available supply of labor were found to impact the distribution of home runs and strike-outs. In essence, whether one examines the distribution of talent via team wins or individual player talent, a similar story is told in Major League Baseball. Changes in the available supply of labor alter the distribution of talent in the league.

With these arguments in hand, let us return to the evidence reported in table 1, where the distribution of team wins is reported for a plethora of sports and leagues. The sport with the smallest dispersion of wins is soccer. Given that this is the sport played by more people around the world, this result is not surprising. What of the pattern in the remaining sports? Following what is observed in professional baseball, one might expect that as world population expands, competitive imbalance gradually decreases over time.

An examination of the levels of competitive balance observed in the 1990s reveals that there is some validity to this conjecture. With respect to the NFL, NHL, AL, NL, and the NBA, we were able to examine the entire history of standings data. Table 2 reports both the average level of competitive balance in each sport prior to 1990 and also in the final decade of the twentieth century. For the NFL, NHL, AL, and NL, the 1990s were more competitive than the historical average posted after the 1990 campaign. Each sport employed a larger population and consequently each sport observed a reduction in the level of competitive imbalance.[8]

The exception to this trend is the NBA. As noted by Quirk and Fort (1997), the NBA entered the 1990s as the least competitive of the major professional team sports. The evidence presented from the 1990s indicates that the relative disparity in team wins has not improved. In fact, the 1990s were the least competitive decade in the history of the NBA. What can explain the inability of professional basketball to achieve a reduction in the dispersion of wins?

The Short Supply of Tall People

One could argue that basketball is second only to soccer in worldwide popularity. Given Gould's argument regarding the impact expanding populations have on the dispersion of skills in a sport, one might expect professional basketball to be relatively competitive. Before such a conclusion is reached, consider the athlete who plays in the NBA. The average height of a young adult male in the United States is between five feet nine and five feet ten.[9] For the years 1994–95 through 2003–04, all but four players were above the average in height.[10] Furthermore, 97.9 percent of young adult males are six feet three or smaller. In the NBA though, less than 20 percent of players in the 2003–04 season were six feet three or smaller. In fact, nearly 30 percent of the league was six feet ten or taller, a height that in the general population is extremely difficult to find.[11]

In each of the other sports considered, training can overcome deficiencies in natural ability. Athletic training can enhance a player's speed, agility, and even weight. There is no amount of training, though, that can make a person taller. As people in the NBA are so fond of saying, one cannot teach height. Consequently, the vertically challenged are very unlikely to play in the NBA. The height requirement in the NBA dramatically reduces the population of available players. Following Gould's analysis, if population is restricted, the variability in performance is increased and competitive imbalance will not be improved.

Table 2. Competitive Imbalance in the Major North American Professional Team Sports Leagues Pre-1990 versus Post-1990

League	Pre-1990 Average	Post-1990 Average
National Football League	1.577	1.480
National Hockey League	1.863	1.777
National League	2.121	1.730
American League	2.172	1.828
National Basketball Association	2.431	2.919

Our review of Gould moved from a discussion of the variation in performance offered by the individual player to the topic of competitive imbalance in Major League Baseball. We have already noted that the NBA has a relatively high level of dispersion in team wins. Following the lead of Schmidt and Berri (2004), do we see evidence of Gould's supposition in the performance of individual players?

According to Gould's work, the smaller the population the greater should be the observed variation in player performance. The population of players the NBA draws upon can be divided into two groups. At one end of the spectrum are players who play in the front court, centers and power forwards. These players are generally six feet ten or taller. Back court players, point guards and shooting guards, are generally six feet four or smaller. If the variation in performance follows the size of the underlying population, then we would expect greater variation in the performance of front court players relative to the shorter back court performers.

To test this hypothesis, we must first measure player performance. Unlike baseball, there does not exist a generally agreed upon summary statistic, like slugging average, that captures an individual player's productivity. Consequently, we considered two measures of productivity to test Gould's hypothesis.

Our first measure is the one factor Berri most consistently found to be correlated with player salaries, points scored (2003).[12] Specifically, we calculated for each player how many points the player scored per minute played.[13] Of course, points scored are but one aspect of a player's production on the court. Consequently, we also considered an index designed to capture a player's performance level in a single number.

The index employed builds upon the seminal work of Scully (1974). Scully, in an effort to measure the marginal product of a baseball player, offered a model connecting team wins to player statistics.[14] The model reported in Berri 2004 adopted the Scully approach in developing a simple measure of marginal product (MP) in professional basketball. This measure is detailed in equation (2).

$$Productivity(MP) = (PTS + TREB + STL) - (FGA - 0.44*FTA - TO) \quad (2)$$

where PTS = points scored, $TREB$ = total rebounds, STL = steals, FGA = field goals attempted, FTA = free throws attempted, and TO = turnovers.

Consistent with our analysis of points scored, we measured a player's overall productivity on a per minute basis. We then examined the variance in productivity in our two populations. The first comprised a sample of players six feet four or smaller who played in the NBA over ten seasons, beginning with the 1994–95 campaign. The second sample, taken across the same set of years, comprised players who were six feet ten or taller. After calculating each player's points scored and productivity per minute, we then computed the standard deviation in performance observed across each sample. The results of these calculations are reported in table 3.

For big men, the standard deviation of points scored ranges from a low of 0.110 to a high of 0.129. Consistent with the supposition of Gould, smaller players offer less deviation in performance. Specifically, the range in standard deviation for points scored is 0.079 to 0.100 for NBA guards. A similar result is found for our productivity index. Standard deviations for big men range from 0.058 to 0.068. Guards offer even less variation, with a range of 0.032 to 0.045. As noted, the differences in each season are generally statistically significant.

These results suggest that there is a short supply of quality tall players. To defend the average NBA player, a teams has to employ a player of adequate size. The limited population of extremely tall males, though, compels teams to employ less athletic players. When such players attempt to defend the better centers and power forwards, the results are often quite predictable. Consider the case of Shaquille O'Neal. O'Neal is a seven-feet-one player whose per minute MP equaled 0.324 in 2003–04. Because the supply of athletes like O'Neal is very limited, teams are forced to employ players such as seven-feet-one Vlade Divac, who could only offer 0.157 per minute MP in 2003–04. For those who watched Sacramento's attempt to dethrone the Los Angeles Lakers in the 2002 Western Conference finals, the difference in the relative abilities of each player is quite obvious. Although Divac has been considered an above-average center in the NBA, his productivity is not near the level of O'Neal. One should note that this argument also applies to back court players. Michael Jordan is six feet six, a height that is still relatively rare in the population. Similar to the problem centers have with O'Neal, the average back court performer was often unable to keep pace with Jordan.

Table 3. The Standard Deviation of NBA Performance Comparing Big Men (Eighty-Two Inches or Taller) versus Small Men (Seventy-Six Inches or Smaller)

Season	n (Big)	n (Small)	PTS (Big)	PTS (Small)	PROD(Big)	PROD(Small)
1994-1995	59	53	0.129*	0.083	0.065*	0.042
1995-1996	62	55	0.121*	0.079	0.068*	0.041
1996-1997	57	59	0.110**	0.088	0.065*	0.043
1997-1998	63	62	0.120*	0.082	0.063*	0.045
1998-1999	63	56	0.119*	0.083	0.060*	0.043
1999-2000	61	53	0.125**	0.092	0.065*	0.041
2000-2001	61	50	0.121***	0.097	0.067*	0.041
2001-2002	59	54	0.117***	0.097	0.058*	0.039
2002-2003	67	50	0.117***	0.100	0.069*	0.038
2003-2004	66	52	0.112**	0.085	0.059*	0.032

*Statistically different from the value for shorter players at the 1 percent level.

**Statistically different from the value for shorter players at the 5 percent level.

***Statistically different from the value for shorter players at the 10 percent level.

Concluding Observations

The literature on competitive imbalance in sports has generally focused upon only one sport at a time and argued that the distribution of wins is a factor within the reach of league policy. When one considers a larger sample of sports and leagues, the impact of league policy on competitive balance becomes less clear. Changes in the underlying population of talent appear to dictate the level of competition in the league. In other words, league institutions cannot trump the power of nature. Consequently, for basketball, a sport that suffers from a short supply of the tall people necessary to play the game, competitive imbalance persists despite the efforts of the individuals who manage the NBA.

Given the problems the NBA has with the size of its underlying population of talent, how will the level of competitive imbalance change in the future? Certainly the population of people playing basketball in the world has increased substantially over time. For many of these persons, though, height limitations eliminate the possibility of a career in the NBA. As noted, only four players shorter than five feet ten have received substantial playing time in the league over the past ten seasons. Increasing the number of people smaller than five feet ten playing the sport will not impact the level of competition in the NBA. Very few of these people will ever be employed by the league.

There appears to be some hope when one considers the population of taller players. For the 2003–04 season, nineteen players who were at least seven feet tall played substantial minutes in the NBA. Of these, nine, or 47 percent, were born in a country other than the United States. Perhaps the most famous case is Yao Ming, a seven-feet-six player from China. Although players of this height have appeared in the NBA before, what separates Ming from other players of this size is that he actually has an abundance of basketball talent. The success of players like Ming suggests that the NBA is now drawing upon the world population of tall players.

The *Statistical Abstract of the United States* also reports that the American population is gradually increasing in size. From this, and with the influx of foreign players into the game, one may conclude that some day there may be enough talented seven-foot centers for each team in the NBA. Unfortunately, the arrival of Ming points to another possibility. Currently there is a short supply of players who are close to seven feet tall. Ming, though, is seven feet six inches tall. Does the arrival of Ming suggest that the height of the average center might increase across time? If this height approaches the height of Ming, the talented seven footer of tomorrow may be at a distinct disadvantage attempting to score on and defend players six inches taller.

In the end, as long as height matters to the sport of basketball, the NBA will employ the tallest athletes it can find. Consequently, one might expect the variability of performance among these giants to remain relatively large, and competitive imbalance will remain problematic for the NBA. In response to this problem the NBA may seek to impose institutional changes such as a stricter payroll cap or distribute gate revenues more evenly. The NBA could also attack the problem by restricting the labor supply to players who are six feet three or smaller.[15] Barring such a dramatic step, though, the analysis offered herein suggests that altering institutions will not result in a level of competitive balance equivalent to those achieved in soccer. The persistent short supply of tall people will likely continue to derail league efforts to solve the NBA's problem of competitive imbalance.

Notes

1. Rodney Fort (2003) defined *competitive imbalance* as "the observed outcome that particular teams win consistently more games during the regular season than the rest of the teams in a league or conference over time" (468).
2. The reserve clause gave each team in Major League Baseball the right to renew the contract according to terms the team would set, hence binding the player to a team until the team no longer desired the player's services. This clause has been examined theoretically in the classic work of Simon Rottenberg (1956), and empirically by Alan Balfour and Philip Porter (1991), Michael Butler (1995), John Vrooman (1995), Ira Horowitz (1997), E. Woodrow Eckard (2001), Craig Depken (1999, 2002), and Martin Schmidt and David Berri (2003). The rookie draft, which allocated amateurs in a league according to the previous season standings, has been examined empirically by James Quirk and Fort (1997), Kevin Grier and Robert Tollison (1994), Horowitz (1997), and Sumner La Croix and Akihiko Kawaura (1999). Finally, revenue sharing and payroll caps have been the focus of Roger Noll (1974), Gerald Scully (1989), Quirk and Fort (1997), Vrooman (1995), Daniel Marburger (1997), and Stefan Kesenne (2000, 2004). The impact of payroll caps was studies by Quirk and Fort (1997), and Vrooman (1995).
3. A variety of measures has been offered in the literature. Competitive balance ratio was offered by Brad Humphreys (2002). The Gini coefficient was employed by Schmidt (2001) and Schmidt and Berri (2001). Depken (1999) focused upon the Hirfindahl-Hirschman index. The relative entropy measure of information theory was utilized in Horowitz 1997. Quirk and Fort (1997) also offered a number of additional measures.
4. The average winning percentage is typically .500. With respect to Major League Baseball, two exceptions to this general condition are possible. First, the introduction of interleague play in 1997 allowed for each league's (ī) to differ from (0.5). A divergence from a mean of (0.5) also was possible prior to interleague play. Major League Baseball has traditionally not played games between noncontenders toward the end of the season postponed due to inclement weather. When this happens, the number of games played for each team can differ. Given these possibilities, we used the actual mean winning percentage in the calculation of the idealized standard deviation rather than the assumed value of (0.5).
5. The data employed to measure competitive balance were found in a number of Web sites: Arena Football.com, The Baseball Archive, ESPN.com, The International Hockey Database, NBA.com, and NFL.com. We also consulted "Kicker," annual pre-season special issues "Bundesliga," 1976/77–2003/04. Additional information was found in Gaschnitz 1997.
6. Schmidt and Berri (2003) reported that a test was conducted to see if leagues that existed in the same time period offered the same level of competitive balance. A *t*-stat was calculated for the following league pairs: The NBA and ABA from 1967–68 to 1975–76; the NHL and WHA from 1972–73 to 1978–79; the Bundesliga and NASL from 1967 to 1984; the NFL and AFL from 1960 to 1969; and the NL and AL from 1900 to 2000. Except for the NHL and WHA, Schmidt and Berri reported that every league pair was found to have a statistically equivalent average level of competitive balance (2003).
7. An additional empirical test of the proposition of Stephen Jay Gould was offered in the work of Sangit Chatterjee and Mustafa Yilmaz (1991), which examined the variability of winning percentage in the AL and NL. These authors found that over time baseball was becoming

more competitive, a result taken to be consistent with the arguments of Gould. The arguments offered by Gould, and supported by Chatterjee and Yilmaz, were echoed in the work of Andrew Zimbalist (1992).

8. With respect to Major League Baseball, the academic literature has noted the general improvement in the dispersion of wins during the twentieth century. Whether one examines the standard deviation of team wins (Quirk and Fort 1997), the dispersion and season-to-season correlation of team winning percentages (Butler 1995, Quirk and Fort 1997, Balfour and Porter 1991), the relative entropy approach (Horowitz 1997), the Gini coefficient (Schmidt 2001, Schmidt and Berri 2001, 2002), the Herfindahl-Hirschman index (Depken 1999), or the competitive balance ratio (Humphreys 2002), the findings from each of these studies have been that baseball became more competitive in the latter years of the twentieth century.
9. *Statistical Abstract of the United States* (2003), table 208. *Young adult male* is defined as being between the ages of 20 and 29.
10. The exceptions were Tyrone (Muggsy) Bogues (five feet three), Earl Boykins (five feet five), Spud Webb (five feet seven), and Keith Jennings (five feet seven). Three additional (five feet ten) players appeared in this time period (Damon Stoudamire, Brevin Knight, Tyus Edney). To be considered in this study players had to have played at least twelve minutes per contest and in sixty regular season games.
11. The source for the player's heights was *The Sporting News NBA Register* (various years). Specifically, 29.5 percent of players who played at least twelve minutes per game and appeared in sixty regular season contests were six feet ten or taller. From the same restricted population, 19.6 percent were six feet eleven or taller while 8.5 percent were at least seven feet tall.
12. Berri examined nine studies of the impact race has upon player salary in the NBA (2003). Of the player statistics considered, only points scored consistently explained player salary. These studies included Kahn and Sherer 1988, Koch and Vander Hill 1988, Brown, Spiro, and Keenan 1991, Dey 1997, Hamilton 1997, Guis and Johnson 1998, Bodvarsson and Brastow 1998, 1999, and Bodvarsson and Partridge 2001.
13. Each of the player statistics we employed in this study can be found in various issues of the *Sporting News NBA Guide* and *NBA Register.*
14. Scully's approach was also employed by Marshall Medoff (1976), Henry Raimondo (1983), Frank Scott, James Long, and Ken Sompii (1985), Andrew Zimbalist (1992), Asher Blass (1992), and Berri (1999), among others.
15. We would like to thank an anonymous referee for this suggestion.

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