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Does Player Performance Increase During the Postseason? A Look at Professional Basketball

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Abstract
This study examines the game logs of professional basketball players to determine whether they exhibit elevated performance during the postseason. In a survey of 10 players who were awarded the Most Valuable Player Award during the NBA Finals for the seasons 2001-02 thru 2010- 11, performance was found to be stable throughout the entire season. Implications for why player performance remains stable and why it believed that player performance increases during the postseason are discussed.

1 Introduction

Many sports journalists and commentators display excitement during the postseason, where it is believed that players elevate their game and showcase their very best talents. Some players, too, claim that their performance is better during the postseason. (New York Post, April 10, 2011). When elite teams experience a slump during the regular season, players and fans often create the impression that their skills will be much sharper come playoff time. Coaches, however, seem to disagree. Rather than play down a rough patch during the regular season, one coach had this to say: "You can't turn the switch on and off like that in basketball without having to face some kind of price. Your game doesn't just come back all of a sudden." (LA Times, April 9, 2011). With players and fans united in the idea of elevated performance, and coaches feeling cause for concern during these slumps, who is most accurate at depicting the actual state of postseason performance?

This study examines the game logs of 10 players who were awarded the Most Valuable Player Award during the NBA Finals for the seasons 2001-02 thru 2010-11. Box score statistics for each game played are used, where data is available. The data are separated into five categories to determine whether an athletes' performance increases during the postseason; specifically, Round 1 (First Round), Round 2 (Semi-Finals), Round 3 (Conference Finals), and Round 4 (NBA Finals). Performance during the regular season is used as a baseline as a means for comparison. By analyzing the relevant box score data, inference can be made as to whether player performance increases progressively throughout the playoffs.

2 Data

All data in the sample come from Yahoo Sports, which publishes detailed player statistics and game logs. The ten players used in the sample are chosen based on having received the NBA Finals Most Valuable Player Award at least once during the period studied. If any player is capable of increased performance, we would expect it to be the leader of the team, who is generally the recipient of the award. The following individual data were collected for each player, with a description that follows: FG% (measures the number of shots made divided by the total shots attempted), 3PT% (measures the number of 3-Pointers made out of all attempted), FT% (measures the number of free throws made out of all attempted), Rbs (sum of offensive and defensive rebounds), Ast (when a player assists a teammate in the scoring of a point), TO (turn over), Stl (steal), Blk (blocked shot), PF (player foul), Pts (points).

3 Analysis I

3.1 Method

Data for each player in the sample is separated into five categories (Regular Season, Round 1, Round 2, Round 3, Round 4), and the arithmetic average of box score data is computed for each category using all players in the sample. Because the number of minutes played per game varies by game, the per minute statistic (PM) is calculated by dividing the data for a given game by the number of minutes played in that game, with the exception of data measured in the form of a percentage. These results are available in Table 1. The results are also shown graphically in Figure 1, Figure 2, and Figure 3. Figure 1 displays the data for field goal percentage, three point field goal percentage, and free throw percentage. Figure 2 shows rebounds, assists, turnovers, and points on a per minute basis. Figure 3 shows steals, blocks, and personal fouls on a per minute basis.

3.2 Results and Discussion

The averaged data do not indicate any drastic changes in overall player performance. Field goal percentage decreases during Rounds 1, 2, and 4 when compared to regular season performance. Three point field goal percentages are shown as increasing for these rounds. Points scored per minute are lower in Round 1 when compared to regular season performance, but are increasing throughout the post-season, with maximum performance matching regular season performance during Rounds 3 and 4.

Table 1:
Arithmetic mean for player statistics in each category
† denotes the use of Per Minute Statistic

	Pts†	FG%	3PT%	FT%	Rbs†	Ast†	TO†	Stl†	Blk†	PF†
Regular Season	0.64	49.09	32.46	78	0.2	0.12	0.07	0.03	0.03	0.07
Round 1	0.58	46.59	38.75	78.88	0.18	0.14	0.08	0.03	0.03	0.08
Round 2	0.61	45.99	40.25	75.54	0.18	0.11	0.07	0.03	0.03	0.07
Round 3	0.64	49.27	31.92	75.53	0.2	0.12	0.08	0.02	0.03	0.07
Round 4	0.64	46.99	35.95	80.31	0.22	0.1	0.08	0.03	0.03	0.07

Figure 1

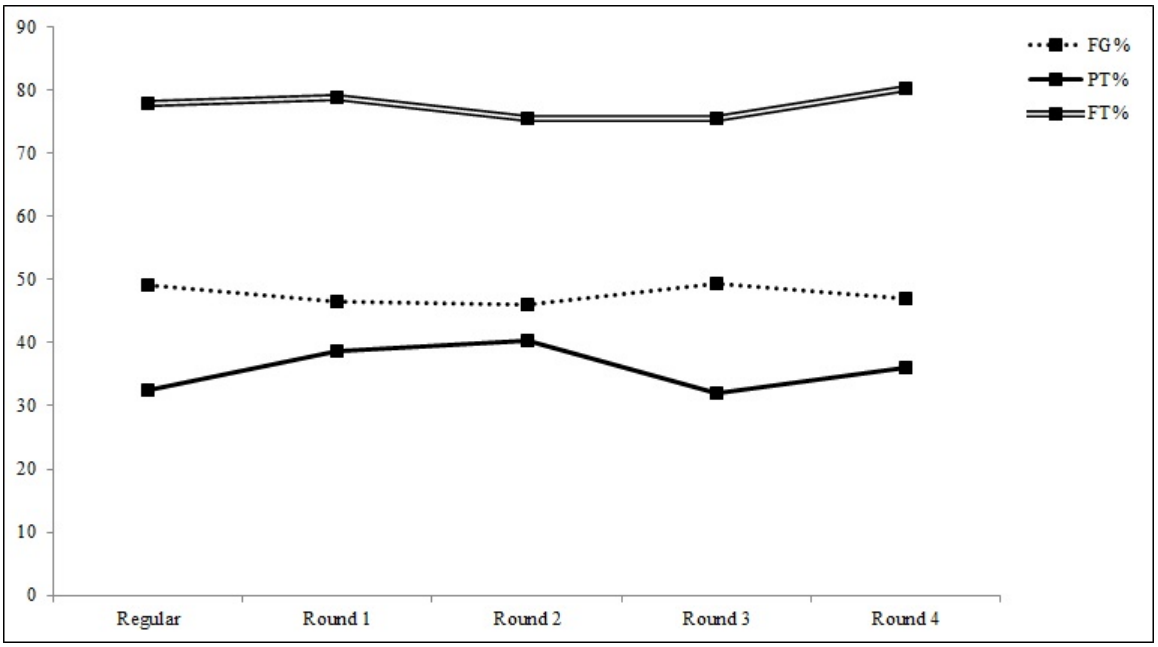


Figure 2

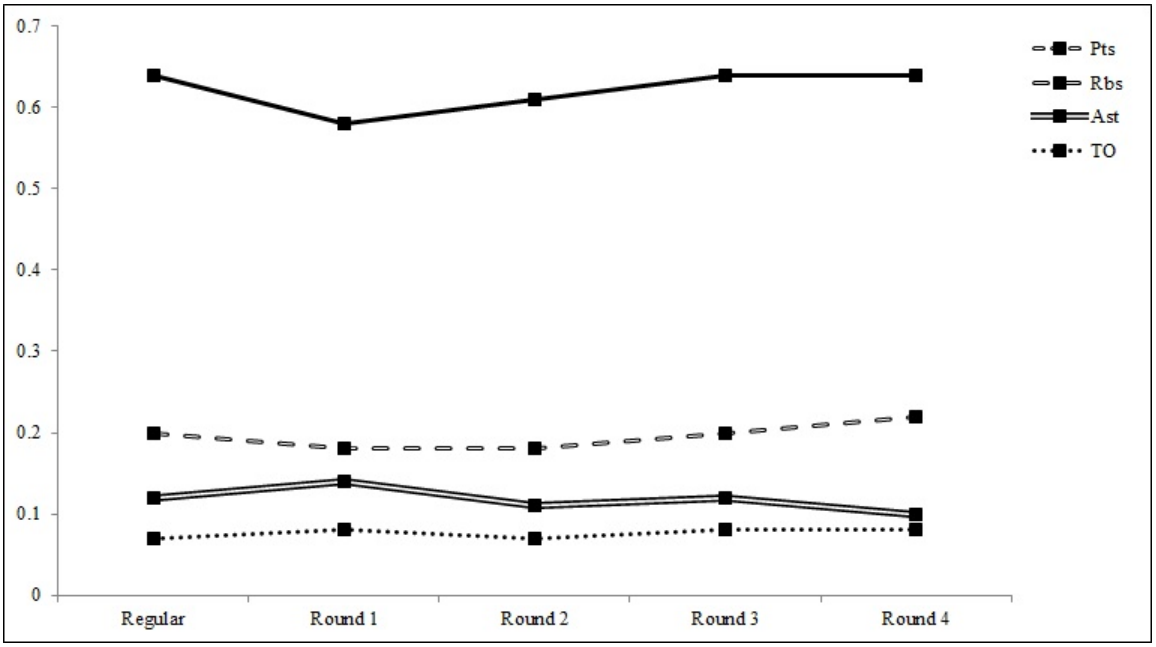
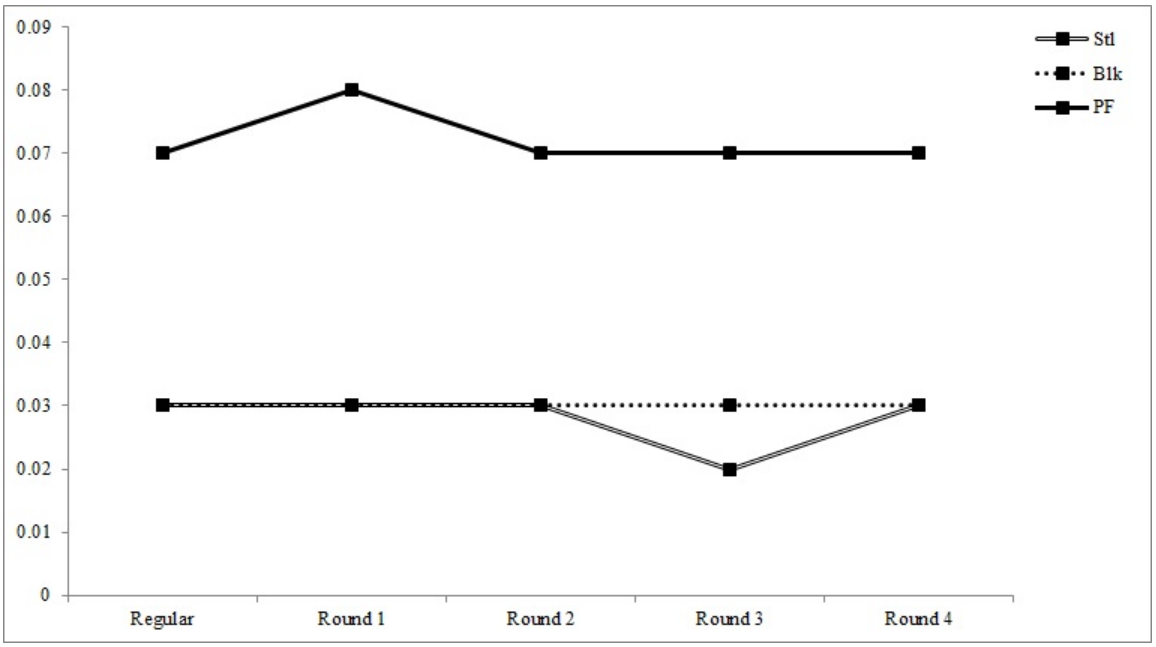


Figure 3



4 Analysis II

4.1 Method

To determine whether the performance of any individual player increased significantly during the postseason, a total of nine[1] equations are constructed for each player, modeling the box score statistic as the dependent variable *y*, in the following form:

$$y = \beta_0 + \beta_1 minutes + \rho_1 Round\,1 + \rho_2 Round\,2 + \rho_3 Round\,3 + \rho_4 Round\,4 + \varepsilon,$$

where β_0 is the intercept, β_1 is the effect of minutes played in a given game, ρ_i represents the change in performance for Round *i* when compared to the Regular Season, and ε is the residual.

Each regression equation consists of a box score statistic which is used as the dependent variable (*y*), and independent variables consisting of the minutes played per game and four dummy variables used to distinguish between games played during the Regular Season, Round 1, Round 2, Round 3, and Round 4. The regular

[1]Some players, such as Centers, rarely attempt 3-point shots. This data is unavailable thus regressions are not computed.

season is used as the base period so that each round can be compared against it to observe the changes in performance. That is, β_0 is the intercept for the Regular Season, and ρ_i is the difference between the Regular Season and Round *i* performance (See Woolridge, *Introductory Econometrics: A Modern Approach, 4th Edition*). The arithmetic mean for the data coefficients are computed for each round after obtaining the results from the equations for each player(a total of 86 regressions). The results are available in Table 2. Table 3 shows the number of players in each category where the coefficient was statistically significant. Appendix 1 lists the coefficients for each box score statistic, for each player.

4.2 Results and Discussion

The average coefficient[2] for points scored per game in Rounds 1-3 are negative, which indicates that players scored fewer points in the first 3 rounds of the playoffs when compared to their regular season performance. Their performance exceeds their regular season performance in Round 4. Interestingly, while the points scored during Rounds 1-3 are less than the points scored during the regular season, the data indicate a rising trend beginning with Round 1 thru Round 4. So, although players did not score more points, on average, from the regular season to the postseason, they scored more points in succeeding rounds as they advanced through the playoffs. A similar pattern is seen with field goal percentage. Three point field goal accuracy increases by as much as 10% while free throw percentage shows an increase of about 2% in Round 4. The results of Table 3 are as expected; the data show that few of the changes in postseason performance are statistically significant.

Table 2:
Arithmetic mean (all players) of data coefficients from regression equations

	Pts	FG%	3PT%	FT%	Ast	Rbs	TO	Stl	Blk	PF
Round 1	-2.20	-2.10	8.32	0.73	0.35	-0.47	0.47	-0.11	-0.10	0.45
Round 2	-1.05	-1.76	10.53	-0.86	-0.37	-0.34	0.05	-0.10	0.07	0.27
Round 3	-0.84	0.34	0.36	0.31	-0.02	-0.04	0.46	-0.21	0.03	0.01
Round 4	0.76	-0.10	3.76	2.02	-0.56	0.56	0.23	-0.04	0.07	0.02

[2]While few of these coefficients were statistically significant, the analysis proceeds to see how player performance changes.

Table 3:
Number of players whose coefficients are statistically significant (alpha = 0.05)

	Pts	FG%	3PT%	FT%	Ast	Rbs	TO	Stl	Blk	PF
Round 1	1	0	0	1	0	1	1	0	0	3
Round 2	1	1	1	0	0	0	0	0	2	0
Round 3	2	0	0	0	3	0	2	0	1	0
Round 4	0	0	0	0	1	1	0	0	1	2

5 Discussion

This analysis has failed to uncover any empirical evidence of the most elite players in the game elevating their performance during the postseason. If anything, player performance decreases slightly when compared to regular season performance. Perhaps the decreased performance is a result of choking under pressure, a term Baumeister (1984) used to describe "the occurrence of inferior performance despite individual striving and situational demands for superior performance," where pressure is defined as "any factor or combination of performing well on a particular occasion." Certainly, a postseason game meets these criteria, as a game won is a step toward becoming World Champions and a game lost is a step closer to the end of the season. This idea may offer support as to why player performance falls during the postseason, and further insight from psychological research may help explain the misconstrued notion that players perform better in games when the stakes are higher.

Psychologists use the term availability heuristic to describe a situation in which a person makes a judgment based on what they can remember rather than the complete data. For example, Kahneman and Tversky (1974) asked subjects whether there exist more 4-letter words that begin with the letter 'r' in the first place or the third place (e.g. ramp vs cars). A majority of participants believed there are more 4-letter words with 'r' in the first place, although this is not the case. The reason for this error is that the mind recalls words by the first letter, making words beginning with the letter 'r' more easily available. This same idea can be applied to the perception of increased performance during the postseason.

Consider the following two events: A buzzer-beating game winning shot during the regular season, and a buzzer-beating game winning shot in the postseason, which may be followed by streams of confetti and lauded celebration. Which of these two events would a person be more likely to remember? The second situation

seems much more memorable, and because of this, people may make the assertion that this type of performance is more common during the playoffs. They are more likely to recall this thrilling event, which occured during the playoffs rather than the regular season. This may lead them to believe that player performance during the postseason exceeds regular season performance.

6 Conclusion

It is all too common to hear sportscasters describe their anticipation as they wait to see elite players competing at their highest levels during the weeks leading up to the NBA postseason. This analysis has shown, empirically, that performance remains stable throughout the entire season. Some issues, however, are present in this study. In addition to problems that arise with small sample sizes, the fact that the quality of the opposing team is higher has not been accounted for. The effects of both teams playing at an elevated level may cancel each other out. However, if that is the case, the fact that player performance increases steadily throughout the postseason, as the quality of the opposing team increases, remains a mystery. Further work in this area may rely on other measures of performance in addition to a larger data set. In the end, the myth of increased player performance may simply be a result of the availability heuristic.

References

[1] Baumeister, R., "Choking Under Pressure: Self-Consciousness and Paradoxical Effects of Incentives on Skillful Performance," *Journal of Personality and Social Psychology,* 1984, Vol. 46, 610-620.

[2] Berman, M., *Knicks' Stoudemire says he plays best during playoffs,* New York Post, 10 Apr. 2011

[3] Kahneman, D., Tversky, A., "Judgment under Uncertainty: Heuristics and Biases," *Science,* 1974, Vol. 185, 1124-1131.

[4] NBA - Statistics, *Yahoo! Sports.*

[5] Turner, B., *All Kidding Aside, Phil Jackson's Concern about Lakers' Slump Is Very Real,* The Los Angeles Times. 09 Apr. 2011

Appendix 1: Coefficients for regressions on individual players

Player	Pts	F□□	□PT□	FT□	Ast	Rbs	TO	Stl	Blk	PF
Sha□uille O□□eal 2001□2002										
Round 1	□□.□□	□2.□0	□/A	9.01	0.□□	□0.□2	0.□□	□0.0□	□0.□□	□0.1□
Round 2	□□.□0	□12.99	□/A	□.□□	0.0□	0.□□	0.0□	□0.0□	0.□□	0.□□
Round □	□0.2□	□□.□□	□/A	□□.□□	□1.□□	1.□0	□1.□□	□0.2□	0.22	0.□□
Round □	□.□□	2.□0	□/A	10.9□	0.□1	0.29	0.□1	□0.20	0.□□	□1.□9
Tim Duncan 2002□200□										
Round 1	□□.1□	□0.09	□/A	□1.1□	0.□□	1.0□	0.1□	□0.19	0.1□	0.1□
Round 2	1.□0	0.29	□/A	0.□□	0.2□	□0.□□	□0.□□	□0.12	□0.□□	0.22
Round □	0.□□	1.□□	□/A	□2.02	0.□□	0.□□	□0.11	0.0□	□0.0□	0.20
Round □	□0.2□	□0.2□	□/A	0.1□	0.19	0.□□	0.0□	0.0□	0.□2	□0.0□
Chauncey Billups 200□□200□										
Round 1	□0.□□	0.□9	□2.□□	2.□1	0.□□	□1.09	□0.□2	0.19	□0.0□	□0.02
Round 2	□□.□1	□□.91	□11.□□	□1□.10	□0.1□	□0.□□	□0.2□	□0.0□	□0.10	0.□□
Round □	□□.2□	□10.□2	□21.□9	0.□□	□0.0□	□0.□□	1.2□	0.10	0.2□	□0.2□
Round □	1.□1	12.□□	□.9□	□.9□	□0.□0	□0.9□	0.12	□0.0□	□0.10	□0.90
Tim Duncan 200□□200□										
Round 1	1.□9	□1.9□	□/A	0.□2	0.□□	0.11	0.□□	□0.□□	□0.0□	1.□1
Round 2	2.□9	□2.92	□/A	□□.1□	□0.2□	□1.□9	0.□9	□0.□□	□0.1□	0.□□
Round □	2.9□	□.02	□/A	□.□□	0.□9	0.□□	0.□0	□0.2□	□0.□□	0.□2
Round □	□□.□□	□□.□2	□/A	□.9□	□0.□□	0.□1	0.0□	□0.□□	□0.□□	□0.2□
Dwayne Wade 200□□200□										
Round 1	□□.□□	□□.□1	1□.□□	12.□□	0.2□	□0.□1	0.□2	□0.1□	0.□2	0.09
Round 2	□□.□□	□2.2□	□□.9□	0.□□	□0.□9	0.□□	0.1□	0.□□	□0.1□	0.□□
Round □	□□.□□	1.□9	□.□□	□1.22	□0.□□	□0.□□	2.21	□0.□□	0.□1	□0.□1
Round □	□.□2	0.0□	1□.12	□2.□1	□□.□□	1.□9	□0.2□	0.20	□0.□9	0.92
Tony Parker 200□□200□										
Round 1	□□.□□	□□.□1	□/A	□.□□	1.2□	□0.□□	0.□□	□0.21	□0.10	0.12
Round 2	□2.□□	□□.□□	□/A	□9.□□	□0.1□	□0.□0	0.□1	□0.29	□0.10	□0.□0
Round □	□0.□1	□□.□□	□/A	□11.2□	1.10	□0.□□	0.9□	0.□□	□0.09	0.□1
Round □	2.09	□.□□	□/A	□2□.□2	□2.□□	1.□□	0.21	□0.□9	□0.10	□0.□□

Player	Pts	F□□	□PT□	FT□	Ast	Rbs	TO	Stl	Blk	PF
Paul Pierce 200□200□										
Round 1	□0.0□	□1.□0	□.□2	□11.□0	0.□□	□0.□1	□0.21	□0.22	□0.□0	1.2□
Round 2	0.09	□2.□□	□0.□9	□1.0□	□1.□0	□0.□□	□0.1□	0.1□	□0.□2	0.□0
Round □	□□.□1	□.□1	□□.□□	□□.□□	□1.□9	□0.12	□0.0□	□0.□2	0.1□	□0.01
Round □	0.□□	□2.0□	□.□□	□2.□9	1.□□	□1.02	0.□□	□0.0□	□0.1□	1.□□
□obe Bryant 200□2009										
Round 1	□□.□1	0.2□	□.□0	1.□□	0.□□	□1.29	0.□9	0.92	□0.1□	0.1□
Round 2	0.□□	□1.□□	2.10	□□.□□	□1.□□	□0.1□	□0.9□	0.2□	1.0□	0.1□
Round □	2.□1	□.□□	0.□□	□.□0	0.2□	□0.□0	□0.99	□0.□0	□0.0□	0.□1
Round □	□0.2□	□0.90	□1□.□9	1.0□	1.□0	□1.0□	□0.1□	0.11	0.□□	0.1□
□obe Bryant 2009□2010										
Round 1	□1.0□	□1.□□	22.□1	□1□.□□	□1.□□	□1.2□	0.□□	□0.□□	□0.0□	1.□□
Round 2	□.1□	□.2□	□19.9□	□.□□	0.□□	□1.90	0.□2	□0.□□	0.□2	0.□2
Round □	□.□□	□.□9	11.20	□.□□	□.1□	1.□□	□0.91	□0.□□	0.□2	□0.□□
Round □	□0.□□	□□.□□	□0.□□	11.□□	□1.□2	2.□□	0.□□	0.□□	0.□□	1.1□
Dirk □owit□ki 2010□2011										
Round 1	□0.20	□□.□1	□.□9	□0.0□	0.00	0.1□	1.□□	□0.2□	□0.□□	0.00
Round 2	□0.21	□.□1	□□.□□	□.□□	□0.22	1.□1	□0.2□	0.12	□0.2□	□0.□1
Round □	0.□1	□□.□2	9.01	10.22	□1.□□	□2.1□	□.1□	□0.0□	□0.□0	□1.□□
Round □	□1.□2	□10.□1	10.19	10.□□	□0.90	1.□1	0.□□	□0.0□	□0.1□	□0.1□