

A method for the unbiased comparison of MLB and NBA career statistics across era

Alexander M. Petersen¹ & Orion Penner²

¹ Laboratory for the Analysis of Complex Economic Systems, IMT Lucca Institute for Advanced Studies, Lucca 55100, Italy

² Complexity Science Group, Dept. of Physics, Univ. of Calgary, Alberta T2N1N4, Canada

Email: petersen.xander@gmail.com

Abstract

Career statistics are commonly used to compare players from different eras, however cross-era comparison is biased due to significant changes in success factors underlying sports achievement (i.e. performance enhancing drugs). The comparison of athletes is more than simply a topic of casual discussion among fans, it is also an issue of critical importance to the history of each major professional sport and the institution (Hall of Fame) in charge of preserving the sport's history. Here we develop and test an objective statistical method for normalizing career success metrics across time dependent factors. This method preserves the overall functional form of the probability distribution of career achievement, both at the season and career level. We re-rank the top-50 all-time records in MLB and the NBA and find that certain achievements (home runs, strikeouts, rebounds) are more sensitive to time-dependent success factors than others (hits, wins).

1 Introduction

Individual success in competitive endeavors, such as professional sports [1,2,3] and academia [2,4], depends on many factors: some factors are time dependent whereas others are time independent. These factors range from the inevitable (rule changes, improved nutrition and training techniques, talent dilution of players from league expansion) to the controversial (performance enhancing drugs). In order to compare human achievements from different time periods, success metrics should be normalized to a common index so that the time dependent factors do not bias the comparison of the statistical measures. In order to address the problem of time dependent factors, we develop a novel approach which removes the time-dependent factors by normalizing a player's annual achievement by a unbiased ability average. The output of our approach are 'detrended' success measures that are more appropriate for comparing and evaluating the relative merits of players from different historical eras. In this paper we demonstrate the utility of our detrending method by analyzing distributions of individual success in two professional sports leagues, Major League Baseball (MLB) and the National

Basketball Association (NBA). We use comprehensive data comprising more than 21,000 individual player careers (data from Sean Lahman’s Baseball Archive: <http://baseball1.com/index.php> and the Database Sports Basketball Archive: <http://www.databasebasketball.com/>.)

In order to make our statistical analysis accessible, we use the most natural measures for accomplishment, the statistics that are listed in every box-score and on every baseball and basketball card, so that the results are tangible to historians and casual fans interested in reviewing and discussing the “all-time greats.” In particular, this study addresses two relevant cultural questions:

- (i) How to quantitatively account for economic, technological, and social factors that influence the rate of success in competitive professions.
- (ii) How to use career statistics in an unbiased fashion to help in the both the standard, as well as, retroactive induction of athletes into a Hall of Fame. This is particularly important given the recent ‘inflation’ observed for home runs in Major League Baseball, a phenomena that is believed to be related to the widespread use of Performance Enhancing Drugs (PED).

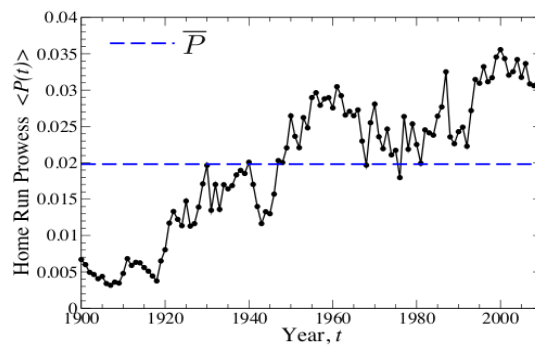


Fig. 1: The seasonal prowess $\langle P(t) \rangle$ measures the relative success rate per opportunity using appropriate measures for a given sport. The home-run prowess demonstrates a significant increasing trend since 1920, reflecting the emergence of the modern “slugger” in MLB. Physiological, technological, economic, and social factors play a strong historical role in the evolution of home-run prowess. By normalizing accomplishments with respect to $\langle P(t) \rangle$, we blindly account for seasonal variations due to all such factors.

2 Methods

We define prowess as an individual player’s ability to achieve a success x (e.g. a home run, point scored) in any given opportunity y (e.g. an AB in MLB or minute played in the NBA). In Fig. 1 we plot the average number of home runs over the 110-year period 1900-2009 in order to demonstrate the non-stationary evolution of home-run ability in MLB. Clearly, the occurrence of a home-run in 1920 was relatively more significant (rare) than the occurrence of a home-run in 1998.

The average prowess serves as an index for comparing accomplishments in distinct years. We conjecture that the changes in the average prowess are related to league-wide factors which can be quantitatively removed (detrended) by normalizing accomplishments by the average prowess for a given season. We first calculate the prowess $P_i(t)$ of an individual player i as $P_i(t) \equiv x_i(t) / y_i(t)$, where

$x_i(t)$ is an individual's total number of successes out of his/her total number $y_i(t)$ of opportunities in a given year t .

To compute the league-wide average prowess, we then compute

$$\langle P(t) \rangle \equiv \sum_i x_i(t) / \sum_i y_i(t) \quad (1)$$

The summation index i runs over all players with at least y_c opportunities during year t , so that $\sum_i y_i(t)$ is the total number of opportunities of all $N(t)$ players during year t . We use a cutoff $y_c \equiv 100$ AB (batters), 100 IPO (pitchers), and 0 Min. (basketball players) which eliminates statistical fluctuations that arise from players with very short seasons.

We now introduce the detrended metric for the accomplishment of player i in year t ,

$$x_i^D(t) \equiv x_i(t) \times \bar{P} / \langle P(t) \rangle \quad (2)$$

where \bar{P} is the average value of $\langle P(t) \rangle$ over the entire period analyzed. The choice of discounting the achievement $x_i(t)$ with respect to \bar{P} is arbitrary, and we could just as well normalize with respect to $\langle P(2000) \rangle$, placing all values in terms of current "2000 US dollars," as they do in economics.

Using this method, we calculate detrended metrics for both single season ($x_i^D(t)$) corresponding to Eq. (3) and total career accomplishments X_i^D corresponding to the sum of seasonal detrended metrics

$$X_i^D \equiv \sum_{s=1}^L x_i^D(s) \quad (3)$$

where s is the season index and L is the player's career length measured in seasons.

In Fig. 2 we plot the league averages

$$\langle x \rangle \equiv \frac{1}{N(t)} \sum_{i=1}^{N(t)} x_i(t) \quad \text{and} \quad \langle x^D \rangle \equiv \frac{1}{N(t)} \sum_{i=1}^{N(t)} x_i^D(t) \quad (4)$$

for points and home runs, calculated using all $N(t)$ players in a given year t . The left column shows the traditional metrics, while the right column shows the average for detrended metrics. The detrended average is nearly constant across era, especially in the case of HR, demonstrating the utility of our normalization methods to standardize achievement. See ref. [3] for additional development and discussion of the methods.

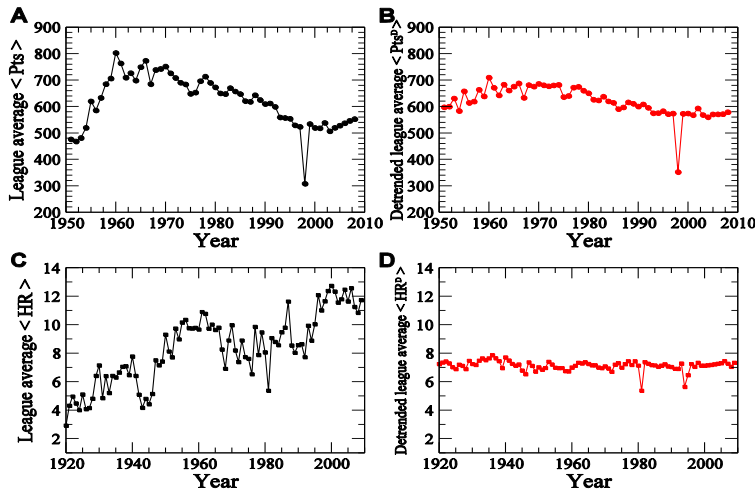


Fig. 2: The annual league average for Pts (NBA) and Home runs (MLB) given in Eq. (6) and calculated before (A,C) and after (B,D) detrending. This method normalizes each season statistic to a baseline prowess $\langle P(t) \rangle$ calculated using all players in a given season. Significant dips are due to league strikes resulting in game cancellations.

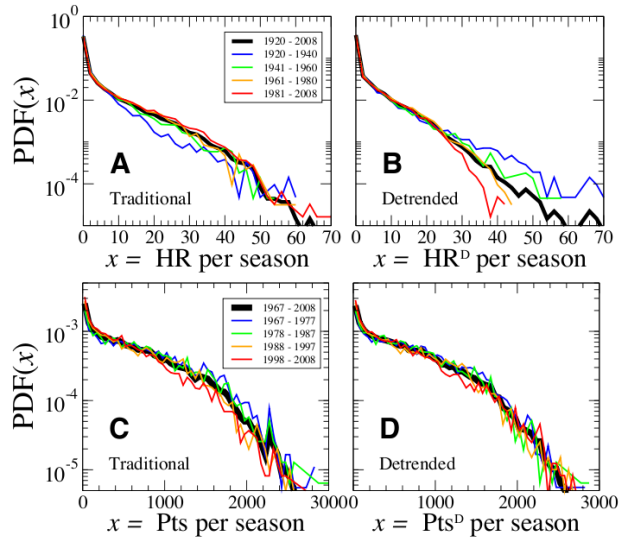


Fig. 3: Probability density function (PDF) of traditional and detrended statistics plotted on log-linear axes, separated by eras indicated in the legend. The detrended measures in panels (B,D) show increased data collapse towards a universal distribution $P(x)$ for smaller values of x confirming that our method normalizes with respect to the bulk of the league's player achievement. However, in the case of HR, this method in fact pronounces some outlier seasonal performances, such as Babe Ruth's career years during the 1920's, which tips the balance in the all-time rankings (see the Appendix Table S1).

3 Results

The goal of this method is to define a statistic that is more suitable for the across-era comparison of season and career achievement measures. We define our detrended statistics by normalizing achievement with respect to annual player averages which serves as a proxy for the underlying era-dependent trends in physiological, technological, and economic factors. We find that certain statistics (home runs, strikeouts, rebounds) are more affected by the detrending method (and underlying success factors) than others (wins, hits).

Fig. 3 shows the probability density function (pdf) of seasonal statistics, HR in MLB and points scored in the NBA, before and after we apply the detrending method. We separate the statistics according to arbitrarily chosen non-overlapping eras, and demonstrate that detrending method normalizes the statistical measures on the aggregate, so that the pdfs in panels (B,D) approximately collapse onto a universal function, except for the right tails. This enhancement effect is pronounced for HR statistics, indicating that extreme home-run achievements can be significantly deflated or inflated by time-dependent factors. As a result, the significant HR seasons for $x^D > 30$ in panel (B) are either significantly above or below the all-time distribution (thick black curve), which causes a significant re-ranking of the all-time home run list at the season (see extensive Tables in [3]) and the career level (see Table S1).

Fig. 4 show the pdfs of career statistics which are stationary under detrending, indicating that the extremely right-skewed (heavy-tailed) distributions for human success result from intrinsic properties underlying achievement and not inflationary factors that influence success rates. This fact

suggests that Babe Ruth and Karl Malone were not “born on another planet,” but rather, follow naturally from a universal success distribution with statistically regular extreme value statistics. See [2,4] for further discussion of the analytic properties of $P(x)$ as predicted by a theoretical career progress model [2]. Among the numerous storylines in the re-ranked tables, Babe Ruth becomes the undisputed home-run king ($HR^D = 1215$) with Mel Ott, Lou Gehrig, and Jimmie Foxx, the 3 runners up, tallying merely half as many detrended HR, a result that signifies the significant lead Babe Ruth had over his cohort when it came to home-run prowess.

For NBA careers, we provide 6 extensive tables in the Supplementary Information Appendix which list the top-50 all-time achievements according (i) traditional rankings and (ii) our detrended rankings, for the statistical categories of points (Pts), rebounds (Reb) and assists (Asst.) at both the season and career level; we also provide a top-20 ranking for career home runs, and refer the curious reader to ref. [3] for additional tables listing MLB top-50 all-time achievements.

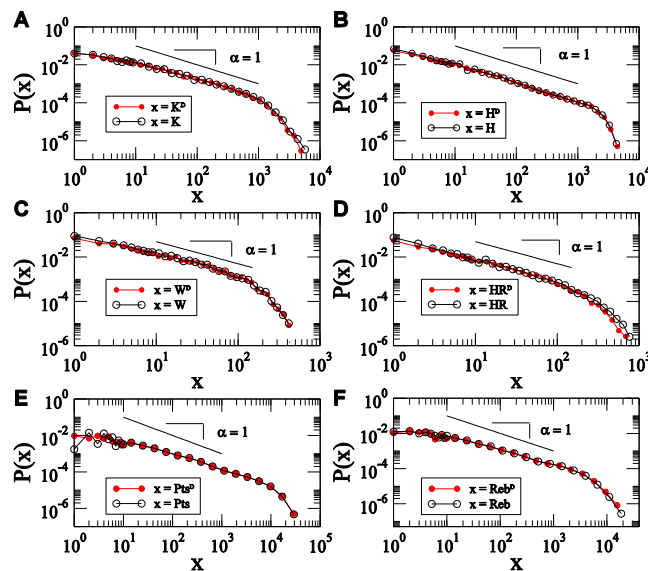


Fig. 4: Probability distributions $P(x)$ plotted on log-log axes for traditional and detrended career statistics: strikeouts (A), hits (B), wins (C), home runs (D), points (E) and rebounds (F). The solid line corresponding to a Pareto (power) -law distribution with scaling exponent $\alpha = 1$ is shown for visual comparison. For MLB, we use careers belonging to the 90-year period 1920-2009 and for the NBA we use careers belonging to the 56-year period 1951-2006.

4 Conclusions

Concepts and methods from statistical physics [1,2,3] and network science [5,6] applied to professional sports data have uncovered statistical laws that describe the underlying nature of competition. Surprisingly, academia also exhibits analogous statistical patterns that conceivably emerge from the general principles of competitive systems, such as the Matthew “rich-get-richer” effect [2,4,7] and the extremely high barriers to entry which results in many “sudden-death” careers [2,8].

In order to account for changes in relative player ability over time, we have developed a detrending method that accounts for inflationary and deflationary factors (PEDs, changes in the physical construction of bats and balls, sizes of ballparks, talent dilution of players from expansion, etc.) and allows for an objective comparison of players across time. Remarkably, we find using our detrending method, that the distributions of career success are invariant after we normalize accomplishments to local ability averages quantified by $\langle P(t) \rangle$. By analyzing the distribution of success across the *entire* set of players (an entire labor force), we can calculate universal benchmarks that can be used for the identification of extraordinary careers. Also, since these benchmarks are calculated using detrended metrics, the benchmarks are robust and stable with respect to the time-dependent factors (see refs. [2,3] for methods to calculate the benchmarks based on the extreme value statistics of the Gamma distribution that is used to model the longevity and success distribution $P(x)$). Specifically, these statistical laws can be used by the Baseball Hall of Fame to address issue (ii), raised above, in the context of induction criteria.

Another surprising observation in this comprehensive study is the large numbers of "one-hit wonders", along with much smaller, but statistically significant and theoretically predictable, number of stellar "iron-horse" careers. In MLB, we find that roughly 3% of non-pitchers (pitchers) have a career lasting only one at-bat (lasting an inning or less) and 5% of non-pitchers complete their in-and-out career with only one hit! Yet, the same profession also sustains careers that span more than 2,000 games, 10,000 at bats and 4,000 innings pitched [3]. The same story can be told for the NBA, where 3% of careers end with careers that span between 1-12 minutes played, and 2% of careers last only 1 game! Yet, the average career length is roughly 273 games (roughly 3 seasons), while the maximum career length is owed to Robert Parish with 1,611 games, almost six times the average! For a higher resolution of in-game opportunities, Kareem Abdul-Jabbar's career spanned 57,446 minutes played, roughly 9 times the average career length in minutes! Similar results have also been observed for professional tennis careers [6]. We quantify this surprising finding with a statistical law which "bridges the gap" between the large number of players with very few career accomplishments and the few players with legendary career accomplishments.

5 References

- [1] A. M. Petersen *et al.*, "On the Distribution of Career Longevity and the Evolution of Home-run Prowess in Professional Baseball," *Europhys. Lett.*, vol. 83, art. 50010, 2008.
- [2] A. M. Petersen *et al.*, "Quantitative and Empirical Demonstration of the Matthew Effect in a Study of Career Longevity," *Proceedings of the National Academy of Sciences USA*, vol. 108, pp. 18-23, 2011.
- [3] A. M. Petersen *et al.*, "Methods for Detrending Success Metrics to Account for Inflationary and Deflationary Factors," *Eur. Phys. J. B*, vol. 79, pp. 67-78, 2011.
- [4] A. M. Petersen *et al.*, "Methods for Measuring the Citations and Productivity of Scientists Across Time and Discipline," *Phys. Rev. E*, vol. 81, art. 036114, 2010.
- [5] S. Saavedra *et al.*, "Mutually-antagonistic Interactions in Baseball Networks," *Physica A*, vol. 389, pp. 1131-1141, 2009.
- [6] F. Radicchi, "Who Is the Best Player Ever? A Complex Network Analysis of the History of Professional Tennis," *PLoS ONE*, vol. 6, art. e17249, 2011.
- [7] A. M. Petersen *et al.*, "Statistical Regularities in the Rank-citation Profile of Scientists," (*Nature*) *Scientific Reports*, vol. 1, art. 181, 2011.
- [8] A. M. Petersen *et al.*, "Persistence and Uncertainty in the Academic Career," (Under Review) *Proceedings of the National Academy of Sciences USA*, 2012.

Supplementary Information Appendix:

A method for the unbiased comparison of MLB and NBA career statistics across era

Alexander M. Petersen¹ and Orion Penner²

¹Laboratory for the Analysis of Complex Economic Systems,
 IMT Lucca Institute for Advanced Studies, Lucca 55100, Italy
²Complexity Science Group, Department of Physics and Astronomy,
 University of Calgary, Calgary, Alberta T2N 1N4, Canada
 (Dated: January 13, 2012)

In Table S1 we list top-20 rankings for MLB home runs (see the Online Supplementary Information for A. M. Petersen, O. Penner, H. E. Stanley, Methods for detrending success metrics to account for inflationary and deflationary factors. Eur. Phys. J. B 79, 67-78 (2011). DOI: 10.1140/epjb/e2010-10647-1) for additional top-50 rankings. In Tables S2-S7 we list top-50 rankings for points, assists and rebounds over the career and for individual seasons. For the two types of rankings, career and season, the columns are organized as follows:

Career Tables S1–S4: The 4 columns on the left of each table list information for the “traditional rank” of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The 5 columns on the right of each table list information for the “detrended rank” ($Rank^*$) of career statistics, where the corresponding traditional rank (Rank) of the player is denoted in parenthesis. L denotes the career length of the player. The relative percent change $\%Change = (Rank^* - Rank)/Rank$.

Season Tables S5–S7: The 4 columns on the left list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics $Rank^*$. $Y\#$ denotes the number of years into the career. The relative percent change $\%Change = (Rank^* - Rank)/Rank$.

Rank	Name	Traditional Rank		Rank*(Rank)	Name	Detrended Rank	
		Final Season (L)	Career Metric			Final Season (L)	Career Metric
1	Barry Bonds	2007 (22)	762	1(3)	Babe Ruth	1935 (22)	1215
2	Hank Aaron	1976 (23)	755	2(23)	Mel Ott	1947 (22)	637
3	Babe Ruth	1935 (22)	714	3(26)	Lou Gehrig	1939 (17)	635
4	Willie Mays	1973 (22)	660	3(17)	Jimmie Foxx	1945 (20)	635
5	Ken Griffey Jr.	2009 (21)	630	5(2)	Hank Aaron	1976 (23)	582
6	Sammy Sosa	2007 (18)	609	6(124)	Rogers Hornsby	1937 (23)	528
7	Frank Robinson	1976 (21)	586	7(192)	Cy Williams	1930 (19)	527
8	Alex Rodriguez	2009 (16)	583	8(1)	Barry Bonds	2007 (22)	502
8	Mark McGwire	2001 (16)	583	9(4)	Willie Mays	1973 (22)	490
10	Harmon Killebrew	1975 (22)	573	10(18)	Ted Williams	1960 (19)	482
11	Rafael Palmeiro	2005 (20)	569	11(13)	Reggie Jackson	1987 (21)	478
12	Jim Thome	2009 (19)	564	12(14)	Mike Schmidt	1989 (18)	463
13	Reggie Jackson	1987 (21)	563	13(7)	Frank Robinson	1976 (21)	444
14	Mike Schmidt	1989 (18)	548	14(10)	Harmon Killebrew	1975 (22)	437
15	Manny Ramirez	2009 (17)	546	15(577)	Gavvy Cravath	1920 (11)	433
16	Mickey Mantle	1968 (18)	536	16(718)	Honus Wagner	1917 (21)	420
17	Jimmie Foxx	1945 (20)	534	17(18)	Willie McCovey	1980 (22)	417
18	Ted Williams	1960 (19)	521	18(557)	Harry Stovey	1893 (14)	413
18	Frank Thomas	2008 (19)	521	19(5)	Ken Griffey Jr.	2009 (21)	411
18	Willie McCovey	1980 (22)	521	20(28)	Stan Musial	1963 (22)	410

TABLE S1: Ranking of Career Home Runs (1871 - 2009).

[1] Corresponding author: Alexander M. Petersen
 E-mail: petersen.xander@gmail.com

Rank	Name	Traditional Rank		Rank*(Rank) % Change		Detrended Rank		Career Metric
		Final Season (L)	Career Metric	Rank*(Rank)	% Change	Name	Final Season (L)	
1	Kareem Abdul-jabbar	1988 (20)	38387	1(2)	50	Karl Malone	2003 (19)	38033
2	Karl Malone	2003 (19)	36928	2(1)	-100	Kareem Abdul-jabbar	1988 (20)	36687
3	Michael Jordan	2002 (15)	32292	3(3)	0	Michael Jordan	2002 (15)	32511
4	Wilt Chamberlain	1972 (14)	31419	4(7)	42	Shaquille O'neal	2008 (17)	29575
5	Julius Erving	1986 (16)	30026	5(5)	0	Julius Erving	1986 (16)	28934
6	Moses Malone	1994 (21)	29580	6(4)	-50	Wilt Chamberlain	1972 (14)	28615
7	Shaquille O'neal	2008 (17)	27619	7(6)	-16	Moses Malone	1994 (21)	28532
8	Dan Issel	1984 (15)	27482	8(10)	20	Hakeem Olajuwon	2001 (18)	27177
9	Elvin Hayes	1983 (16)	27313	9(8)	-12	Dan Issel	1984 (15)	26362
10	Hakeem Olajuwon	2001 (18)	26946	10(16)	37	Reggie Miller	2004 (18)	26361
11	Oscar Robertson	1973 (14)	26710	11(12)	8	Dominique Wilkins	1998 (15)	26110
12	Dominique Wilkins	1998 (15)	26668	12(21)	42	Allen Iverson	2008 (13)	26040
13	George Gervin	1985 (14)	26595	13(9)	-44	Elvin Hayes	1983 (16)	26035
14	John Havlicek	1977 (16)	26395	14(22)	36	Kobe Bryant	2008 (13)	25797
15	Alex English	1990 (15)	25613	15(13)	-15	George Gervin	1985 (14)	25666
16	Reggie Miller	2004 (18)	25279	16(20)	20	Patrick Ewing	2001 (17)	25129
16	Rick Barry	1979 (14)	25279	17(14)	-21	John Havlicek	1977 (16)	24796
18	Jerry West	1973 (14)	25192	18(15)	-20	Alex English	1990 (15)	24551
19	Artis Gilmore	1987 (17)	24941	19(11)	-72	Oscar Robertson	1973 (14)	24459
20	Patrick Ewing	2001 (17)	24815	20(19)	-5	Artis Gilmore	1987 (17)	24023
21	Allen Iverson	2008 (13)	23983	21(16)	-31	Rick Barry	1979 (14)	23893
22	Kobe Bryant	2008 (13)	23820	22(23)	4	Charles Barkley	1999 (16)	23748
23	Charles Barkley	1999 (16)	23757	23(28)	17	Gary Payton	2006 (17)	23374
24	Robert Parish	1996 (21)	23334	24(18)	-33	Jerry West	1973 (14)	23115
25	Adrian Dantley	1990 (15)	23177	25(31)	19	Kevin Garnett	2008 (14)	23111
26	Elgin Baylor	1971 (14)	23149	26(24)	-8	Robert Parish	1996 (21)	22615
27	Clyde Drexler	1997 (15)	22195	27(25)	-8	Adrian Dantley	1990 (15)	22230
28	Gary Payton	2006 (17)	21813	28(27)	-3	Clyde Drexler	1997 (15)	22035
29	Larry Bird	1991 (13)	21791	29(34)	14	David Robinson	2002 (14)	21578
30	Hal Greer	1972 (15)	21586	30(38)	21	Ray Allen	2008 (13)	21338
31	Kevin Garnett	2008 (14)	21277	31(35)	11	Mitch Richmond	2001 (14)	21192
32	Walt Bellamy	1974 (14)	20941	32(26)	-23	Elgin Baylor	1971 (14)	21163
33	Bob Pettit	1964 (11)	20880	33(29)	-13	Larry Bird	1991 (13)	20946
34	David Robinson	2002 (14)	20790	34(44)	22	Tim Duncan	2008 (12)	20921
35	Mitch Richmond	2001 (14)	20497	35(40)	12	Clifford Robinson	2006 (18)	20726
36	Tom Chambers	1997 (16)	20049	36(47)	23	Dirk Nowitzki	2008 (11)	20641
37	John Stockton	2002 (19)	19711	37(54)	31	Paul Pierce	2008 (11)	20204
38	Ray Allen	2008 (13)	19661	38(37)	-2	John Stockton	2002 (19)	20203
39	Bernard King	1992 (14)	19655	39(33)	-18	Bob Pettit	1964 (11)	20033
40	Clifford Robinson	2006 (18)	19591	40(58)	31	Vince Carter	2008 (11)	19768
41	Walter Davis	1991 (15)	19521	41(30)	-36	Hal Greer	1972 (15)	19734
42	Terry Cummings	1999 (18)	19460	42(50)	16	Scottie Pippen	2003 (17)	19595
43	Bob Lanier	1983 (14)	19248	43(36)	-19	Tom Chambers	1997 (16)	19433
44	Tim Duncan	2008 (12)	19246	44(32)	-37	Walt Bellamy	1974 (14)	19277
45	Eddie Johnson	1998 (17)	19202	45(56)	19	Glen Rice	2003 (15)	19146
46	Gail Goodrich	1978 (14)	19181	46(42)	-9	Terry Cummings	1999 (18)	19051
47	Dirk Nowitzki	2008 (11)	19084	47(49)	4	Dale Ellis	1999 (17)	18999
48	Reggie Theus	1990 (13)	19015	48(39)	-23	Bernard King	1992 (14)	18914
49	Dale Ellis	1999 (17)	19002	49(71)	30	Tracy Mcgrady	2008 (12)	18808
50	Scottie Pippen	2003 (17)	18940	50(41)	-21	Walter Davis	1991 (15)	18748

TABLE S2: Ranking of Career Points (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics $Rank^*$, where the corresponding traditional ranking of the player is denoted in parenthesis. L denotes the career length of the player. The relative percent change $\%Change = (Rank^* - Rank)/Rank$.

Rank	Name	Traditional Rank		Rank*(Rank)	% Change	Name	Detrended Rank	
		Final Season (L)	Career Metric				Final Season (L)	Career Metric
1	Wilt Chamberlain	1972 (14)	23924	1(1)	0	Wilt Chamberlain	1972 (14)	19896
2	Bill Russell	1968 (13)	21620	2(3)	33	Moses Malone	1994 (21)	19323
3	Moses Malone	1994 (21)	17834	3(4)	25	Kareem Abdul-jabbar	1988 (20)	17782
4	Kareem Abdul-jabbar	1988 (20)	17440	4(2)	-100	Bill Russell	1968 (13)	17424
5	Artis Gilmore	1987 (17)	16330	5(5)	0	Artis Gilmore	1987 (17)	16924
6	Elvin Hayes	1983 (16)	16279	6(7)	14	Karl Malone	2003 (19)	16907
7	Karl Malone	2003 (19)	14967	7(8)	12	Robert Parish	1996 (21)	16178
8	Robert Parish	1996 (21)	14715	8(6)	-33	Elvin Hayes	1983 (16)	16136
9	Nate Thurmond	1976 (14)	14464	9(12)	25	Hakeem Olajuwon	2001 (18)	15463
10	Walt Bellamy	1974 (14)	14241	10(13)	23	Buck Williams	1997 (17)	14522
11	Wes Unseld	1980 (13)	13769	11(16)	31	Shaquille O'neal	2008 (17)	14414
12	Hakeem Olajuwon	2001 (18)	13747	12(18)	33	Dikembe Mutombo	2008 (18)	14148
13	Buck Williams	1997 (17)	13018	13(17)	23	Charles Barkley	1999 (16)	14120
14	Jerry Lucas	1973 (11)	12942	14(20)	30	Charles Oakley	2003 (19)	13740
15	Bob Pettit	1964 (11)	12849	15(21)	28	Dennis Rodman	1999 (14)	13515
16	Shaquille O'neal	2008 (17)	12566	16(23)	30	Kevin Garnett	2008 (14)	13479
17	Charles Barkley	1999 (16)	12546	17(11)	-54	Wes Unseld	1980 (13)	13439
18	Dikembe Mutombo	2008 (18)	12359	18(22)	18	Kevin Willis	2006 (21)	13424
19	Paul Silas	1979 (16)	12357	19(24)	20	Patrick Ewing	2001 (17)	13099
20	Charles Oakley	2003 (19)	12205	20(9)	-122	Nate Thurmond	1976 (14)	12891
21	Dennis Rodman	1999 (14)	11954	21(10)	-110	Walt Bellamy	1974 (14)	12219
22	Kevin Willis	2006 (21)	11901	22(30)	26	Tim Duncan	2008 (12)	12151
23	Kevin Garnett	2008 (14)	11682	23(32)	28	David Robinson	2002 (14)	11915
24	Patrick Ewing	2001 (17)	11606	24(28)	14	Jack Sikma	1990 (14)	11839
25	Elgin Baylor	1971 (14)	11463	25(35)	28	Otis Thorpe	2000 (17)	11667
26	Dan Issel	1984 (15)	11133	26(19)	-36	Paul Silas	1979 (16)	11657
27	Bill Bridges	1974 (13)	11054	27(34)	20	Bill Laimbeer	1993 (14)	11513
28	Jack Sikma	1990 (14)	10816	28(26)	-7	Dan Issel	1984 (15)	11361
29	Caldwell Jones	1989 (17)	10685	29(29)	0	Caldwell Jones	1989 (17)	11347
30	Tim Duncan	2008 (12)	10546	30(14)	-114	Jerry Lucas	1973 (11)	11112
31	Julius Erving	1986 (16)	10525	31(31)	0	Julius Erving	1986 (16)	10873
32	David Robinson	2002 (14)	10497	32(43)	25	Horace Grant	2003 (17)	10697
33	Dave Cowens	1982 (11)	10444	33(42)	21	A.c. Green	2000 (16)	10685
34	Bill Laimbeer	1993 (14)	10400	34(47)	27	Ben Wallace	2008 (13)	10643
35	Otis Thorpe	2000 (17)	10370	35(45)	22	Vlade Divac	2004 (16)	10637
36	Johnny Kerr	1965 (12)	10092	36(15)	-140	Bob Pettit	1964 (11)	10436
37	Bob Lanier	1983 (14)	9698	37(33)	-12	Dave Cowens	1982 (11)	10351
38	Sam Lacey	1982 (13)	9687	38(52)	26	Shawn Kemp	2002 (14)	10074
39	Zelmo Beaty	1974 (12)	9665	39(46)	15	Maurice Lucas	1987 (14)	9945
40	Dave Debusschere	1973 (12)	9618	40(50)	20	Larry Bird	1991 (13)	9908
41	Mel Daniels	1976 (9)	9528	41(57)	28	Dale Davis	2006 (16)	9851
42	A.c. Green	2000 (16)	9473	42(37)	-13	Bob Lanier	1983 (14)	9790
43	Horace Grant	2003 (17)	9443	43(38)	-13	Sam Lacey	1982 (13)	9732
44	Bailey Howell	1970 (12)	9383	44(55)	20	Michael Cage	1999 (15)	9698
45	Vlade Divac	2004 (16)	9326	45(27)	-66	Bill Bridges	1974 (13)	9682
46	Maurice Lucas	1987 (14)	9306	46(59)	22	P.j. Brown	2007 (15)	9679
47	Ben Wallace	2008 (13)	9243	47(56)	16	Terry Cummings	1999 (18)	9642
48	George McGinnis	1981 (11)	9233	48(48)	0	George McGinnis	1981 (11)	9413
49	Johnny Green	1972 (14)	9083	49(61)	19	Chris Webber	2007 (15)	9356
50	Larry Bird	1991 (13)	8974	50(25)	-100	Elgin Baylor	1971 (14)	9280

TABLE S3: Ranking of Career Rebounds (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics $Rank^*$, where the corresponding traditional ranking of the player is denoted in parenthesis. L denotes the career length of the player. The relative percent change $\%Change = (Rank^* - Rank)/Rank$.

Rank	Name	Traditional Rank		Rank*(Rank)	% Change	Detrended Rank		
		Final Season (L)	Career Metric			Name	Final Season (L)	Career Metric
1	John Stockton	2002 (19)	15806	1(1)	0	John Stockton	2002 (19)	15289
2	Mark Jackson	2003 (17)	10323	2(3)	33	Jason Kidd	2008 (15)	10841
3	Jason Kidd	2008 (15)	10199	3(2)	-50	Mark Jackson	2003 (17)	10222
4	Magic Johnson	1995 (13)	10141	4(5)	20	Oscar Robertson	1973 (14)	10144
5	Oscar Robertson	1973 (14)	9887	5(7)	28	Gary Payton	2006 (17)	9229
6	Isiah Thomas	1993 (13)	9061	6(4)	-50	Magic Johnson	1995 (13)	9145
7	Gary Payton	2006 (17)	8964	7(6)	-16	Isiah Thomas	1993 (13)	8190
8	Rod Strickland	2004 (17)	7987	8(9)	11	Steve Nash	2008 (13)	8090
9	Steve Nash	2008 (13)	7504	9(8)	-12	Rod Strickland	2004 (17)	8005
10	Maurice Cheeks	1992 (15)	7392	10(11)	9	Lenny Wilkens	1974 (15)	7407
11	Lenny Wilkens	1974 (15)	7211	11(14)	21	Guy Rodgers	1969 (12)	7183
12	Terry Porter	2001 (17)	7160	12(13)	7	Tim Hardaway	2002 (13)	7064
13	Tim Hardaway	2002 (13)	7095	13(19)	31	Stephon Marbury	2008 (13)	6920
14	Guy Rodgers	1969 (12)	6917	14(12)	-16	Terry Porter	2001 (17)	6800
15	Muggsy Bogues	2000 (14)	6726	15(10)	-50	Maurice Cheeks	1992 (15)	6653
16	Kevin Johnson	1999 (12)	6711	16(27)	40	Andre Miller	2008 (10)	6469
17	Derek Harper	1998 (16)	6571	17(15)	-13	Muggsy Bogues	2000 (14)	6435
18	Nate Archibald	1983 (13)	6476	18(16)	-12	Kevin Johnson	1999 (12)	6390
19	Stephon Marbury	2008 (13)	6471	19(23)	17	Jerry West	1973 (14)	6340
20	John Lucas	1989 (14)	6454	20(29)	31	Sam Cassell	2008 (16)	6260
21	Reggie Theus	1990 (13)	6453	21(26)	19	John Havlicek	1977 (16)	6164
22	Norm Nixon	1988 (10)	6386	22(17)	-29	Derek Harper	1998 (16)	6162
23	Jerry West	1973 (14)	6238	23(18)	-27	Nate Archibald	1983 (13)	6088
24	Scottie Pippen	2003 (17)	6135	24(24)	0	Scottie Pippen	2003 (17)	6079
25	Clyde Drexler	1997 (15)	6125	25(31)	19	Nick Vanexel	2005 (13)	6002
26	John Havlicek	1977 (16)	6114	26(28)	7	Mookie Blaylock	2001 (13)	5934
27	Andre Miller	2008 (10)	6020	27(35)	22	Allen Iverson	2008 (13)	5911
28	Mookie Blaylock	2001 (13)	5972	28(30)	6	Avery Johnson	2003 (16)	5891
29	Sam Cassell	2008 (16)	5939	29(20)	-45	John Lucas	1989 (14)	5831
30	Avery Johnson	2003 (16)	5846	30(21)	-42	Reggie Theus	1990 (13)	5787
31	Nick Vanexel	2005 (13)	5777	31(25)	-24	Clyde Drexler	1997 (15)	5731
32	Larry Bird	1991 (13)	5695	32(22)	-45	Norm Nixon	1988 (10)	5719
33	Kareem Abdul-jabbar	1988 (20)	5660	33(38)	13	Damon Stoudamire	2007 (13)	5689
34	Michael Jordan	2002 (15)	5633	34(37)	8	Dave Bing	1977 (12)	5428
35	Allen Iverson	2008 (13)	5512	35(34)	-2	Michael Jordan	2002 (15)	5359
36	Dennis Johnson	1989 (14)	5499	36(33)	-9	Kareem Abdul-jabbar	1988 (20)	5290
37	Dave Bing	1977 (12)	5397	37(49)	24	Baron Davis	2008 (10)	5266
38	Damon Stoudamire	2007 (13)	5371	38(44)	13	Kenny Anderson	2004 (14)	5252
39	Kevin Porter	1982 (10)	5314	39(53)	26	Mike Bibby	2008 (11)	5226
40	Jeff Hornacek	1999 (14)	5281	40(41)	2	Karl Malone	2003 (19)	5220
41	Karl Malone	2003 (19)	5248	41(32)	-28	Larry Bird	1991 (13)	5132
42	Rickey Green	1991 (14)	5221	42(40)	-5	Jeff Hornacek	1999 (14)	5064
43	Norm Vanlier	1978 (10)	5217	43(47)	8	Walt Frazier	1979 (13)	5050
44	Kenny Anderson	2004 (14)	5196	44(43)	-2	Norm Vanlier	1978 (10)	5049
45	Julius Erving	1986 (16)	5176	45(58)	22	Chauncey Billups	2008 (12)	5048
46	Sleepy Floyd	1994 (13)	5175	46(36)	-27	Dennis Johnson	1989 (14)	4940
47	Walt Frazier	1979 (13)	5040	47(39)	-20	Kevin Porter	1982 (10)	4928
48	Rick Barry	1979 (14)	4952	48(59)	18	Wilt Chamberlain	1972 (14)	4848
49	Baron Davis	2008 (10)	4902	49(64)	23	Kevin Garnett	2008 (14)	4847
50	Nate Mcmillan	1997 (12)	4893	50(66)	24	Brevin Knight	2008 (12)	4815

TABLE S4: Ranking of Career Assists (1951 - 2006). The left columns lists the traditional ranking of career statistics, where the top 50 players are ranked along with their final season (career length in seasons listed in parenthesis) and their career metric tally. The right columns list the detrended ranking of career statistics $Rank^*$, where the corresponding traditional ranking of the player is denoted in parenthesis. L denotes the career length of the player. The relative percent change $\%Change = (Rank^* - Rank)/Rank$.

Rank	Name	Traditional Rank		Rank*(Rank)	% Change	Detrended Rank		
		Season (Y#)	Season Metric			Name	Season (Y#)	Season Metric
1	Wilt Chamberlain	1961 (3)	4029	1(1)	0	Wilt Chamberlain	1961 (3)	3543
2	Wilt Chamberlain	1962 (4)	3586	2(2)	0	Wilt Chamberlain	1962 (4)	3248
3	Michael Jordan	1986 (3)	3041	3(7)	57	Kobe Bryant	2005 (10)	3060
4	Wilt Chamberlain	1960 (2)	3033	4(3)	-33	Michael Jordan	1986 (3)	2892
5	Wilt Chamberlain	1963 (5)	2948	5(8)	37	Bob Mcadoo	1974 (3)	2823
6	Michael Jordan	1987 (4)	2868	6(5)	-20	Wilt Chamberlain	1963 (5)	2771
7	Kobe Bryant	2005 (10)	2832	7(6)	-16	Michael Jordan	1987 (4)	2769
8	Bob Mcadoo	1974 (3)	2831	8(37)	78	Kobe Bryant	2002 (7)	2711
9	Kareem Abdul-jabbar	1971 (3)	2822	9(11)	18	Michael Jordan	1989 (6)	2690
10	Rick Barry	1966 (2)	2775	10(4)	-150	Wilt Chamberlain	1960 (2)	2681
11	Michael Jordan	1989 (6)	2753	11(34)	67	LeBron James	2005 (3)	2677
12	Elgin Baylor	1962 (5)	2719	12(49)	75	Tracy Mcgrady	2002 (6)	2651
12	Nate Archibald	1972 (3)	2719	13(9)	-44	Kareem Abdul-jabbar	1971 (3)	2646
14	Wilt Chamberlain	1959 (1)	2707	14(55)	74	Jerry Stackhouse	2000 (6)	2629
15	Wilt Chamberlain	1965 (7)	2649	15(42)	64	Michael Jordan	1996 (12)	2625
16	Charlie Scott	1971 (2)	2637	16(31)	48	Michael Jordan	1995 (11)	2618
17	Michael Jordan	1988 (5)	2633	17(12)	-41	Nate Archibald	1972 (3)	2598
18	Kareem Abdul-jabbar	1970 (2)	2596	18(62)	70	Michael Jordan	1997 (13)	2582
19	George Gervin	1979 (8)	2585	19(43)	55	Kobe Bryant	2006 (11)	2580
20	Michael Jordan	1990 (7)	2580	20(57)	64	Allen Iverson	2005 (10)	2568
21	George Gervin	1981 (10)	2551	21(20)	-5	Michael Jordan	1990 (7)	2540
22	Michael Jordan	1992 (9)	2541	22(66)	66	Gilbert Arenas	2005 (5)	2535
23	Karl Malone	1989 (5)	2540	23(22)	-4	Michael Jordan	1992 (9)	2525
24	Dan Issel	1971 (2)	2538	24(17)	-41	Michael Jordan	1988 (5)	2522
24	Elgin Baylor	1960 (3)	2538	25(68)	63	Shaquille O'neal	1999 (8)	2514
26	Wilt Chamberlain	1964 (6)	2534	26(52)	50	Dwyane Wade	2008 (6)	2498
27	Moses Malone	1981 (8)	2520	27(105)	74	Allen Iverson	2002 (7)	2492
28	Spencer Haywood	1969 (1)	2519	28(23)	-21	Karl Malone	1989 (5)	2482
29	Rick Barry	1971 (6)	2518	29(84)	65	Allen Iverson	2004 (9)	2479
30	Walt Bellamy	1961 (1)	2495	30(19)	-57	George Gervin	1979 (8)	2475
31	Michael Jordan	1995 (11)	2491	31(16)	-93	Charlie Scott	1971 (2)	2472
32	Oscar Robertson	1963 (4)	2480	32(10)	-220	Rick Barry	1966 (2)	2468
32	Dan Issel	1970 (1)	2480	33(12)	-175	Elgin Baylor	1962 (5)	2463
34	LeBron James	2005 (3)	2478	34(21)	-61	George Gervin	1981 (10)	2457
35	Jerry West	1965 (6)	2476	35(53)	33	David Robinson	1993 (5)	2450
36	Julius Erving	1975 (5)	2462	36(14)	-157	Wilt Chamberlain	1959 (1)	2448
37	Kobe Bryant	2002 (7)	2461	37(57)	35	Shaquille O'neal	1993 (2)	2444
38	Adrian Dantley	1981 (6)	2457	38(40)	5	Rick Barry	1974 (9)	2443
39	Adrian Dantley	1980 (5)	2452	39(126)	69	Allen Iverson	2000 (5)	2438
40	Rick Barry	1974 (9)	2450	40(76)	47	Kobe Bryant	2007 (12)	2431
41	Oscar Robertson	1961 (2)	2432	41(115)	64	Karl Malone	1996 (12)	2428
42	Michael Jordan	1996 (12)	2431	42(27)	-55	Moses Malone	1981 (8)	2427
43	Kobe Bryant	2006 (11)	2430	43(36)	-19	Julius Erving	1975 (5)	2414
44	Bob Pettit	1961 (8)	2429	44(82)	46	LeBron James	2008 (6)	2412
45	Bob Mcadoo	1975 (4)	2427	45(131)	65	Karl Malone	1997 (13)	2399
46	Adrian Dantley	1983 (8)	2418	46(26)	-76	Wilt Chamberlain	1964 (6)	2396
47	Alex English	1985 (10)	2414	47(77)	38	Shaquille O'neal	1994 (3)	2390
48	Oscar Robertson	1966 (7)	2412	48(50)	4	Michael Jordan	1991 (8)	2389
49	Tracy Mcgrady	2002 (6)	2407	49(15)	-226	Wilt Chamberlain	1965 (7)	2388
50	Michael Jordan	1991 (8)	2404	50(45)	-11	Bob Mcadoo	1975 (4)	2379

TABLE S5: Ranking of Season Points (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics $Rank^*$. $Y\#$ denotes the number of years into the career.

Rank	Name	Traditional Rank		Rank*(Rank)	% Change	Detrended Rank		
		Season (Y#)	Season Metric			Name	Season (Y#)	Season Metric
1	Wilt Chamberlain	1960 (2)	2149	1(28)	96	Dennis Rodman	1991 (6)	1691
2	Wilt Chamberlain	1961 (3)	2052	2(4)	50	Wilt Chamberlain	1967 (9)	1666
3	Wilt Chamberlain	1966 (8)	1957	3(5)	40	Wilt Chamberlain	1962 (4)	1628
4	Wilt Chamberlain	1967 (9)	1952	4(1)	-300	Wilt Chamberlain	1960 (2)	1605
5	Wilt Chamberlain	1962 (4)	1946	5(2)	-150	Wilt Chamberlain	1961 (3)	1600
6	Wilt Chamberlain	1965 (7)	1943	6(8)	25	Bill Russell	1963 (8)	1595
7	Wilt Chamberlain	1959 (1)	1941	7(3)	-133	Wilt Chamberlain	1966 (8)	1587
8	Bill Russell	1963 (8)	1930	8(6)	-33	Wilt Chamberlain	1965 (7)	1552
9	Bill Russell	1964 (9)	1878	9(11)	18	Bill Russell	1962 (7)	1542
10	Bill Russell	1960 (5)	1868	10(43)	76	Moses Malone	1978 (5)	1537
11	Bill Russell	1962 (7)	1843	11(27)	59	Artis Gilmore	1973 (3)	1532
12	Bill Russell	1961 (6)	1790	11(9)	-22	Bill Russell	1964 (9)	1532
13	Wilt Chamberlain	1963 (5)	1787	13(52)	75	Dennis Rodman	1993 (8)	1530
14	Bill Russell	1965 (10)	1779	14(16)	12	Wilt Chamberlain	1968 (10)	1479
15	Bill Russell	1959 (4)	1778	15(20)	25	Spencer Haywood	1969 (1)	1478
16	Wilt Chamberlain	1968 (10)	1712	16(13)	-23	Wilt Chamberlain	1963 (5)	1477
17	Bill Russell	1966 (11)	1700	17(29)	41	Wilt Chamberlain	1972 (14)	1468
18	Wilt Chamberlain	1964 (6)	1673	18(22)	18	Wilt Chamberlain	1971 (13)	1467
19	Jerry Lucas	1965 (3)	1668	19(37)	48	Elvin Hayes	1973 (6)	1458
20	Spencer Haywood	1969 (1)	1637	20(7)	-185	Wilt Chamberlain	1959 (1)	1456
21	Bill Russell	1958 (3)	1612	21(14)	-50	Bill Russell	1965 (10)	1421
22	Wilt Chamberlain	1971 (13)	1572	22(35)	37	Artis Gilmore	1972 (2)	1420
23	Bill Russell	1957 (2)	1564	23(12)	-91	Bill Russell	1961 (6)	1396
24	Jerry Lucas	1967 (5)	1560	24(96)	75	Dennis Rodman	1997 (12)	1395
25	Jerry Lucas	1966 (4)	1547	24(10)	-140	Bill Russell	1960 (5)	1395
26	Bob Pettit	1960 (7)	1540	26(32)	18	Artis Gilmore	1971 (1)	1391
27	Artis Gilmore	1973 (3)	1538	27(73)	63	Kevin Willis	1991 (7)	1390
28	Dennis Rodman	1991 (6)	1530	28(54)	48	Artis Gilmore	1974 (4)	1385
29	Wilt Chamberlain	1972 (14)	1526	29(48)	39	Kareem Abdul-jabbar	1975 (7)	1384
30	Walt Bellamy	1961 (1)	1500	30(17)	-76	Bill Russell	1966 (11)	1379
31	Wilt Chamberlain	1970 (12)	1493	31(18)	-72	Wilt Chamberlain	1964 (6)	1365
32	Wes Unseld	1968 (1)	1491	32(31)	-3	Wilt Chamberlain	1970 (12)	1341
32	Artis Gilmore	1971 (1)	1491	33(15)	-120	Bill Russell	1959 (4)	1333
34	Bill Russell	1968 (13)	1484	33(119)	72	Dwight Howard	2007 (4)	1333
35	Artis Gilmore	1972 (2)	1476	35(19)	-84	Jerry Lucas	1965 (3)	1332
36	Mel Daniels	1970 (4)	1475	35(24)	-45	Jerry Lucas	1967 (5)	1332
37	Elvin Hayes	1973 (6)	1463	37(36)	-2	Mel Daniels	1970 (4)	1325
38	Mel Daniels	1969 (3)	1462	38(38)	0	Mel Daniels	1969 (3)	1320
39	Bob Pettit	1961 (8)	1459	39(69)	43	Truck Robinson	1977 (4)	1319
40	Julius Keye	1970 (2)	1454	40(106)	62	Moses Malone	1981 (8)	1318
41	Bill Russell	1967 (12)	1451	41(111)	63	Moses Malone	1980 (7)	1307
42	Elgin Baylor	1960 (3)	1447	42(87)	51	Swen Nater	1979 (7)	1306
43	Moses Malone	1978 (5)	1444	42(40)	-5	Julius Keye	1970 (2)	1306
44	Elvin Hayes	1968 (1)	1406	44(67)	34	Artis Gilmore	1975 (5)	1304
45	Nate Thurmond	1968 (6)	1402	45(128)	64	Kevin Garnett	2003 (9)	1302
46	Nate Thurmond	1964 (2)	1395	45(70)	35	Swen Nater	1974 (2)	1302
47	Elvin Hayes	1969 (2)	1386	47(120)	60	Dikembe Mutombo	1999 (9)	1299
48	Kareem Abdul-jabbar	1975 (7)	1383	48(57)	15	Nate Thurmond	1972 (10)	1297
49	Nate Thurmond	1966 (4)	1382	49(99)	50	Moses Malone	1982 (9)	1293
50	Jerry Lucas	1963 (1)	1375	50(21)	-138	Bill Russell	1958 (3)	1290

TABLE S6: Ranking of Season Rebounds (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics $Rank^*$. $Y\#$ denotes the number of years into the career.

Rank	Name	Traditional Rank		Rank* (Rank)	% Change	Detrended Rank		Season Metric
		Season (Y#)	Season Metric			Name	Season (Y#)	
1	John Stockton	1990 (7)	1164	1(1)	0	John Stockton	1990 (7)	1085
2	John Stockton	1989 (6)	1134	2(4)	50	John Stockton	1991 (8)	1061
3	John Stockton	1987 (4)	1128	3(2)	-50	John Stockton	1989 (6)	1052
4	John Stockton	1991 (8)	1126	4(3)	-33	John Stockton	1987 (4)	1007
5	Isiah Thomas	1984 (4)	1123	4(6)	33	John Stockton	1988 (5)	1007
6	John Stockton	1988 (5)	1118	6(9)	33	John Stockton	1994 (11)	998
7	Kevin Porter	1978 (7)	1099	7(5)	-40	Isiah Thomas	1984 (4)	985
8	John Stockton	1993 (10)	1031	8(7)	-14	Kevin Porter	1978 (7)	982
9	John Stockton	1994 (11)	1011	9(16)	43	Mark Jackson	1996 (10)	979
10	Kevin Johnson	1988 (2)	991	9(17)	47	Chris Paul	2007 (3)	979
11	Magic Johnson	1990 (12)	989	11(8)	-37	John Stockton	1993 (10)	972
12	Magic Johnson	1988 (10)	988	12(27)	55	Steve Nash	2006 (11)	959
13	John Stockton	1992 (9)	987	13(26)	50	Steve Nash	2007 (12)	949
14	Magic Johnson	1986 (8)	977	14(34)	58	Oscar Robertson	1964 (5)	947
15	Magic Johnson	1984 (6)	968	15(34)	55	Chris Paul	2008 (4)	945
16	Mark Jackson	1996 (10)	935	16(34)	52	Steve Nash	2004 (9)	933
17	Chris Paul	2007 (3)	925	17(30)	43	Oscar Robertson	1963 (4)	932
18	John Stockton	1995 (12)	916	17(22)	22	Guy Rodgers	1966 (9)	932
19	Isiah Thomas	1983 (3)	914	19(18)	-5	John Stockton	1995 (12)	930
19	Norm Nixon	1983 (7)	914	20(28)	28	Andre Miller	2001 (3)	928
21	Nate Archibald	1972 (3)	910	21(51)	58	Steve Nash	2005 (10)	925
22	Guy Rodgers	1966 (9)	908	22(11)	-100	Magic Johnson	1990 (12)	922
23	Magic Johnson	1989 (11)	907	23(13)	-76	John Stockton	1992 (9)	921
23	Magic Johnson	1985 (7)	907	24(33)	27	Deron Williams	2007 (3)	912
25	Oscar Robertson	1961 (2)	899	25(37)	32	John Stockton	1996 (13)	901
26	Steve Nash	2007 (12)	897	26(10)	-160	Kevin Johnson	1988 (2)	893
27	Steve Nash	2006 (11)	884	27(12)	-125	Magic Johnson	1988 (10)	890
28	Andre Miller	2001 (3)	882	28(43)	34	Oscar Robertson	1966 (7)	867
29	Magic Johnson	1983 (5)	875	29(14)	-107	Magic Johnson	1986 (8)	866
30	Oscar Robertson	1963 (4)	868	30(25)	-20	Oscar Robertson	1961 (2)	865
30	Mark Jackson	1987 (1)	868	31(58)	46	Jason Kidd	2007 (14)	853
32	Muggsy Bogues	1989 (3)	867	32(56)	42	Jason Kidd	2001 (8)	850
33	Deron Williams	2007 (3)	862	32(40)	20	Oscar Robertson	1965 (6)	850
34	Oscar Robertson	1964 (5)	861	32(21)	-52	Nate Archibald	1972 (3)	850
34	Chris Paul	2008 (4)	861	35(15)	-133	Magic Johnson	1984 (6)	849
34	Steve Nash	2004 (9)	861	35(41)	14	Guy Rodgers	1965 (8)	849
37	John Stockton	1996 (13)	860	37(68)	45	Oscar Robertson	1968 (9)	844
38	Magic Johnson	1987 (9)	858	38(23)	-65	Magic Johnson	1989 (11)	841
39	Sleepy Floyd	1986 (5)	848	39(59)	33	Rod Strickland	1997 (10)	839
40	Oscar Robertson	1965 (6)	847	40(52)	23	Guy Rodgers	1962 (5)	836
41	Guy Rodgers	1965 (8)	846	41(114)	64	Wilt Chamberlain	1967 (9)	835
41	Kevin Johnson	1989 (3)	846	42(46)	8	Norm Vanlier	1970 (2)	816
43	Oscar Robertson	1966 (7)	845	43(83)	48	Deron Williams	2006 (2)	808
44	Kevin Porter	1977 (6)	837	43(141)	69	Lenny Wilkens	1967 (8)	808
45	Kevin Johnson	1991 (5)	836	45(19)	-136	Isiah Thomas	1983 (3)	806
46	Norm Vanlier	1970 (2)	832	45(19)	-136	Norm Nixon	1983 (7)	806
46	Michealray Richardson	1979 (2)	832	47(23)	-104	Magic Johnson	1985 (7)	804
48	Terry Porter	1987 (3)	831	47(32)	-46	Muggsy Bogues	1989 (3)	804
49	Isiah Thomas	1985 (5)	830	49(61)	19	Avery Johnson	1995 (8)	801
50	Magic Johnson	1982 (4)	829	50(90)	44	Jason Kidd	2006 (13)	799

TABLE S7: Ranking of Season Assists (1951 - 2008). The left columns list the traditional ranking of season statistics, where the top 50 players are ranked along with the year. The right columns list the detrended ranking of season statistics $Rank^*$. $Y\#$ denotes the number of years into the career.