Predicting Statistical Growth of Young NBA Players

Sam Rudovsky

How well do rookie year statistics predict sophomore year productivity?

Data

http://www.basketball-reference.com

Features

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|-----------|------|------------|---------|--------|-----|-----|--------|-----|--------|---------|-----|-----|------|-----|-----|------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Season | Age | Tm | Lg | Pos | G | GS | MP ▼ | FG | FGA | FG% | 3P | ЗРА | 3P% | 2P | 2PA | 2P% | eFG% | FT | FTA | FT% | ORB | DRB | TRB | AST | STL | BLK | TOV | PF | PTS |
| 2018-19 | 28 | TOT | NBA | SF | 35 | 35 | 34.4 | 4.5 | 10.3 | .431 | 2.4 | 6.4 | .378 | 2.0 | 3.9 | .518 | .548 | 1.9 | 2.5 | .764 | 0.8 | 4.7 | 5.5 | 1.3 | 2.1 | 1.3 | 1.3 | 3.6 | 13.3 |
| 2017-18 | 27 | PHI | NBA | SF | 80 | 80 | 31.7 | 4.3 | 10.5 | .413 | 2.5 | 6.9 | .369 | 1.8 | 3.6 | .497 | .534 | 1.5 | 1.7 | .853 | 0.7 | 4.7 | 5.4 | 2.0 | 1.7 | 0.9 | 1.6 | 3.0 | 12.6 |
| 2016-17 | 26 | PHI | NBA | SF | 67 | 67 | 31.6 | 4.4 | 10.9 | .399 | 2.0 | 6.1 | .333 | 2.3 | 4.8 | .484 | .492 | 2.1 | 2.6 | .822 | 1.4 | 5.1 | 6.5 | 1.5 | 1.9 | 1.0 | 2.0 | 3.0 | 12.9 |
| 2015-16 | 25 | PHI | NBA | SF | 67 | 49 | 28.4 | 4.1 | 10.6 | .385 | 2.5 | 7.2 | .353 | 1.6 | 3.4 | .452 | .504 | 2.1 | 2.6 | .791 | 1.0 | 5.3 | 6.3 | 1.4 | 1.6 | 0.6 | 2.1 | 3.5 | 12.8 |
| 2014-15 | 24 | PHI | NBA | SF | 70 | 49 | 27.9 | 4.3 | 10.8 | .396 | 2.4 | 6.4 | .374 | 1.9 | 4.4 | .426 | .506 | 2.5 | 3.1 | .820 | 0.9 | 3.6 | 4.5 | 1.5 | 1.4 | 0.4 | 1.8 | 2.7 | 13.5 |
| 2013-14 | 23 | HOU | NBA | SF | 7 | 0 | 4.9 | 0.9 | 2.0 | .429 | 0.6 | 1.6 | .364 | 0.3 | 0.4 | .667 | .571 | 0.0 | 0.0 | | 0.3 | 0.4 | 0.7 | 0.0 | 0.3 | 0.0 | 0.1 | 0.4 | 2.3 |
| Career | | | NBA | | 326 | 280 | 29.9 | 4.2 | 10.5 | .402 | 2.3 | 6.5 | .360 | 1.9 | 3.9 | .471 | .514 | 2.0 | 2.4 | .813 | 0.9 | 4.6 | 5.5 | 1.6 | 1.7 | 0.8 | 1.8 | 3.0 | 12.7 |
| 5 seasons | | <u>PHI</u> | NBA | | 297 | 258 | 30.1 | 4.2 | 10.6 | .400 | 2.4 | 6.6 | .359 | 1.9 | 4.0 | .466 | .512 | 2.0 | 2.4 | .817 | 1.0 | 4.7 | 5.6 | 1.6 | 1.6 | 0.8 | 1.9 | 3.1 | 12.9 |
| 1 season | | MTN | NRA | | 22 | 22 | 34.7 | 4.8 | 11.1 | 433 | 2.5 | 6.7 | 372 | 2.3 | 44 | 526 | 545 | 2.3 | 3.0 | 773 | 1.0 | 4.8 | 5.7 | 1.5 | 2.3 | 1.1 | 1.1 | 3.7 | 14.5 |

4.9 0.9 2.0 .429 0.6 1.6 .364 0.3 0.4 .667

HOU NBA

1 season

Features

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|-----|-----|--------|-----------|---------------|-----------------|--------------------|-----------------------|--------------------------|------------------------------|------------------------------------|-------------------------------------|------|---|--|--|--|---|--|--|--|--|--|--|--|--|--|--|---|
| Age | Tm | Lg | Pos | G | GS | MP | FG | FGA | FG% ▼ | 3P | ЗРА | 3P% | 2P | 2PA | 2P% | eFG% | FT | FTA | FT% | ORB | DRB | TRB | AST | STL | BLK | TOV | PF | PTS |
| 28 | TOT | NBA | SF | 35 | 35 | 34.4 | 4.5 | 10.3 | .431 | 2.4 | 6.4 | .378 | 2.0 | 3.9 | .518 | .548 | 1.9 | 2.5 | .764 | 0.8 | 4.7 | 5.5 | 1.3 | 2.1 | 1.3 | 1.3 | 3.6 | 13.3 |
| | Age | Age Tm | Age Tm Lg | Age Tm Lg Pos | Age Tm Lg Pos G | Age Tm Lg Pos G GS | Age Tm Lg Pos G GS MP | Age Tm Lg Pos G GS MP FG | Age Tm Lg Pos G GS MP FG FGA | Age Tm Lg Pos G GS MP FG FGA FG% ▼ | Age Tm Lg Pos G GS MP FG FGA FG% 3P | | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB AST | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB AST STL | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB AST STL BLK | Age Tm Lg Pos G GS MP FG FGA FG% 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB AST STL BLK TOV | Me Share & more ▼ Glossary Show Partial Rows Age Tm Lg Pos G GS MP FG FGA FG% ▼ 3P 3PA 3P% 2P 2PA 2P% eFG% FT FTA FT% ORB DRB TRB AST STL BLK TOV PF 28 TOT NBA SF 35 35 34.4 4.5 10.3 .431 2.4 6.4 .378 2.0 3.9 .518 .548 1.9 2.5 .764 0.8 4.7 5.5 1.3 2.1 1.3 1.3 3.6 |

| 177 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|----|-----|-----|----|----|----|------|-----|------|------|-----|-----|------|-----|-----|------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 2013-14 | 23 | HOU | NBA | SF | 7 | 0 | 4.9 | 0.9 | 2.0 | .429 | 0.6 | 1.6 | .364 | 0.3 | 0.4 | .667 | .571 | 0.0 | 0.0 | | 0.3 | 0.4 | 0.7 | 0.0 | 0.3 | 0.0 | 0.1 | 0.4 | 2.3 |
| 2017-18 | 27 | PHI | NBA | SF | 80 | 80 | 31.7 | 4.3 | 10.5 | .413 | 2.5 | 6.9 | .369 | 1.8 | 3.6 | .497 | .534 | 1.5 | 1.7 | .853 | 0.7 | 4.7 | 5.4 | 2.0 | 1.7 | 0.9 | 1.6 | 3.0 | 12.6 |
| 2016-17 | 26 | PHI | NBA | SF | 67 | 67 | 31.6 | 4.4 | 10.9 | .399 | 2.0 | 6.1 | .333 | 2.3 | 4.8 | .484 | .492 | 2.1 | 2.6 | .822 | 1.4 | 5.1 | 6.5 | 1.5 | 1.9 | 1.0 | 2.0 | 3.0 | 12.9 |

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2.0 .429 0.6 1.6 .364 0.3 0.4 .667

.385 2.5

.402 2.3

297 258 30.1 4.2 10.6 .400 2.4

2014-15

2015-16

Career

5 seasons

1 season

1 season

PHI

25 PHI

NBA

NBA

NBA

PHI NBA

MIN NBA

SF

Features

| Per Ga | ame | S | hare 8 | & mor | e ▼ | Glo | ossary | S | how I | Partial | Rov | vs | | | | | | | | | | | | | | | | | |
|---------|-----|-----|--------|-------|-----|-----|--------|-----|-------|---------|-----|-----|------|-----|-----|------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----------|
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.333 2.3

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.369 1.8

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1.6 .364 0.3 0.4 .667

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6.6 .359 1.9

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0.0

2.0 3.0

2.1 3.5

0.1 0.4

0.1 0.4

1.9 3.1 12.9

1.6

2016-17

2015-16

2017-18

2013-14

Career 5 seasons

1 season

1 season

26 PHI

25

PHI

PHI

HOU

PHI

NBA

NBA

NBA

NBA

NBA

NBA

MIN NBA

HOU NBA

SF

SF

SF

SF

31.6 4.4 10.9

28.4 4.1 10.6

31.7 4.3

4.9 0.9

.399 2.0

.385 2.5

.429 0.6

.413 2.5

2.0 .429 0.6

2.0

29.9 4.2 10.5 .402 2.3

34.7 4.8 11.1 .433 2.5

258 30.1 4.2 10.6 .400 2.4

6.1

6.9

1.6

6.5

Other Features

- Rebounds
- Assists
- Steals
- Shots taken
- Total games played

Target

| Per Ga | me | SI | hare 8 | k mo | re ▼ | Glo | ossary | / H | lide P | artial F | Rows | 3 | | | | | | | | | | | | | | | | | |
|-----------|-----|-----|--------|------|------|-----|--------|-----|--------|----------|------|-----|------|-----------|-----|------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|------|
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| 2018-19 | 28 | PHI | NBA | SF | 13 | 13 | 33.8 | 3.8 | 9.0 | .427 | 2.3 | 5.9 | .390 | 1.5 | 3.1 | .500 | .556 | 1.3 | 1.8 | .739 | 0.5 | 4.6 | 5.2 | 1.1 | 1.8 | 1.8 | 1.7 | 3.5 | 11.3 |
| 2018-19 | 28 | MIN | NBA | SF | 22 | 22 | 34.7 | 4.8 | 11.1 | .433 | 2.5 | 6.7 | .372 | 2.3 | 4.4 | .526 | .545 | 2.3 | 3.0 | .773 | 1.0 | 4.8 | 5.7 | 1.5 | 2.3 | 1.1 | 1.1 | 3.7 | 14.5 |
| Career | | | NBA | | 326 | 280 | 29.9 | 4.2 | 10.5 | .402 | 2.3 | 6.5 | .360 | 1.9 | 3.9 | .471 | .514 | 2.0 | 2.4 | .813 | 0.9 | 4.6 | 5.5 | 1.6 | 1.7 | 0.8 | 1.8 | 3.0 | 12.7 |
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Data Cleaning

- More than 10 mins per game
- More than 30 games in a season
- Played a second year

Data Cleaning

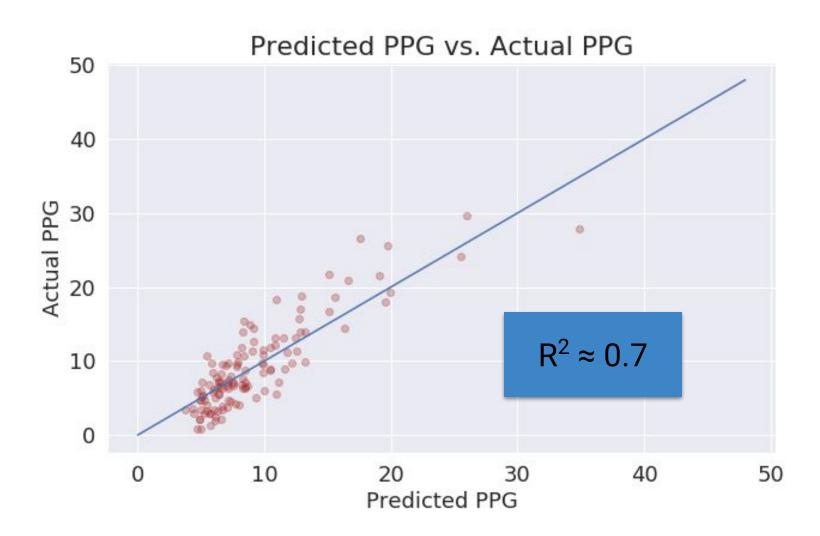
Outliers

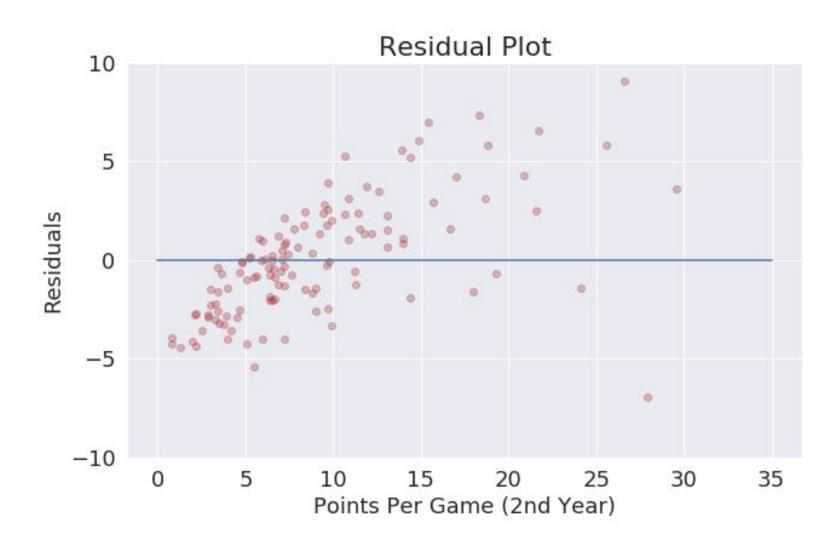
Players who had severe drop in productivity

Feature Engineering

- More minutes → More shots
- More shots → More points scored
- Polynomial Features
- LassoCV

Results

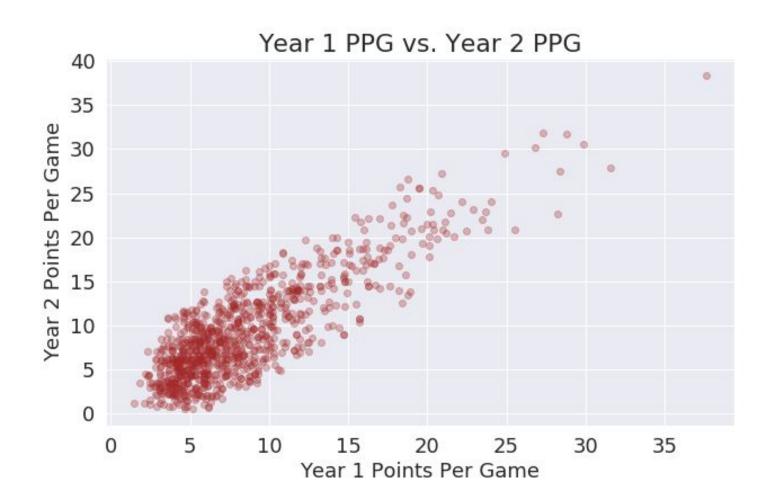




Insight

Insight #1

Year one scoring production
is the best predictor of year
two scoring production



Insight #2

Be patient

