

1. *Provide analytical breakdowns of one NBA player you like and one you dislike.*

Like: Nikola Jokic

Dislike: Tim Hardaway Jr.

Breakdown: Nikola Jokic, C, Denver Nuggets, #15

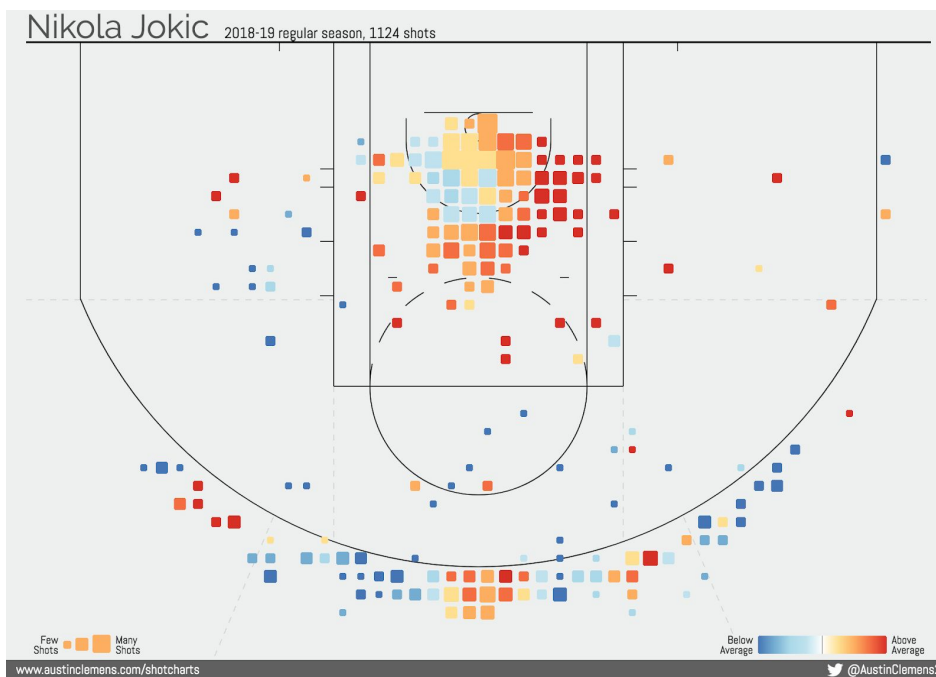
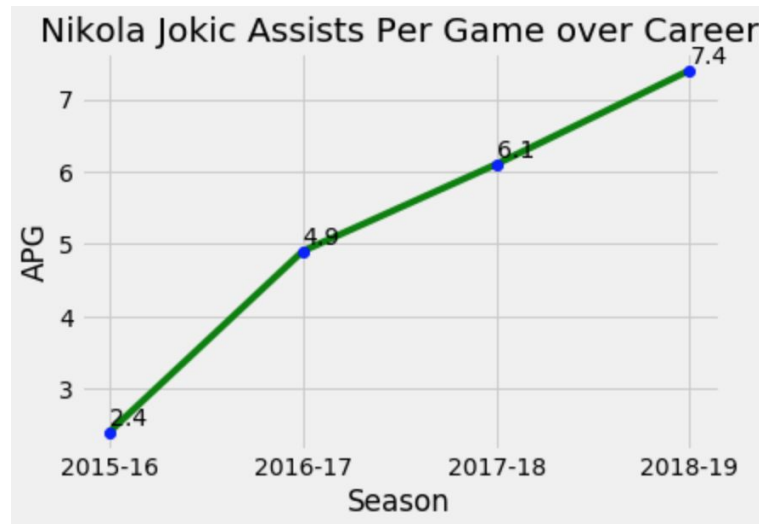


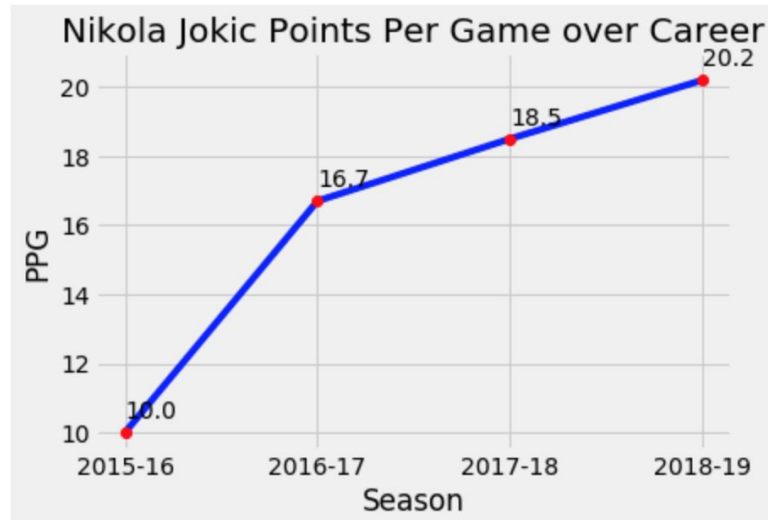
Figure 1

Sources: Basketball Reference, austinclemens.com/shotcharts,
<https://www.youtube.com/watch?v=sUSJ-0JwiQQ>

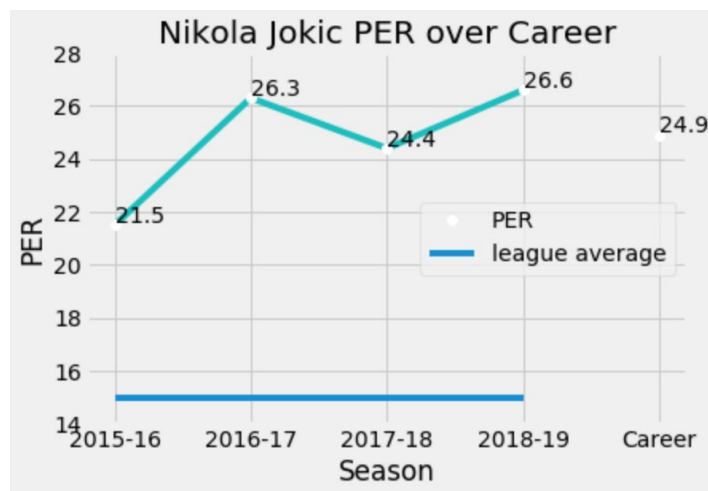
Nikola Jokic was drafted 41st overall in the 2014 NBA draft. Since joining the Nuggets in 2015, Jokic has seen consistent improvement every year in his scoring ability as well as his playmaking abilities, most notably high assist numbers, which are alarming for 7'0 center. For the 2018-2019 season, he currently ranks 8th in assists of all players. Considering that Jokic is the only center in the top 34, this statistic jumps off the page. Looking at the Toronto Raptors vs. Denver Nuggets game from December 3, 2018, Jokic is often stationed on the high key near the 3-point line. They like to get him the ball either at the elbow or in the low post and have guys cut. At 0:03 in the video, you can see him take the ball at the right elbow and feed Paul Milsap on his way to an easy layup. Jokic has great vision and is a very unselfish player. While he likes to look for cutters going to the hoop, he also has no problem swinging the ball out wide to the corner to get a clean corner 3-pointer, as can be seen at 0:45 when he makes an absurd cross court pass to Jamal in the right corner for an open 3. His physicality and skill often drives opposing coaches to double team him and create opportunities for his teammates on the outside or cutting to the basket. There is a great instance of this sort of play at 2:31 in the Raptors video, where he gets doubled and immediately recognizes it and passes a beautiful high pass to Plumlee for an easy finish at the rim. It is also important to note his court vision. There were two instances in this game where Jokic got the ball on a fast break and fed a leading guard for an easy dunk or layup. His ability to move the ball fast is what makes him such a threat. While he is a dominant scorer inside as shown by the shot chart in *Figure 1*, he has the ability to move the ball and set up his teammates to score, which is invaluable for a team. Looking at his assists from his rookie year until now, the improvement is staggering.



Nikola's ability to find teammates and get them great open looks stems from his scoring ability. Teams have a lot of trouble defending him down low, due to his size and skill. He likes to play at around the top of the key in the half court set, near the 3 point line and use his body for pick and rolls with smaller guards. At 1:10 in the Raptor game highlight video, you can see him take the ball, pass it off to a guard and set a high screen. He likes to roll to the basket a lot and use his height to finish the ball at the rim. In this instance, you can see him stop his run, pump-fake, and finish the play with an and-one. He most often rolls all the way to the rim and looks for quick finishes inside, but he also occasionally likes to slip to the midrange area and shoot a mid range jump shot if his defender is playing off of him. If you look at 3:04 in the highlight video, you can see him setting the screen, then rolling towards the basket and finishing a nice floater around the foul line. His touch for his size is also quite impressive and this has made him a threat from anywhere near the basket. His scoring numbers have also increased on a steady pace as shown below.

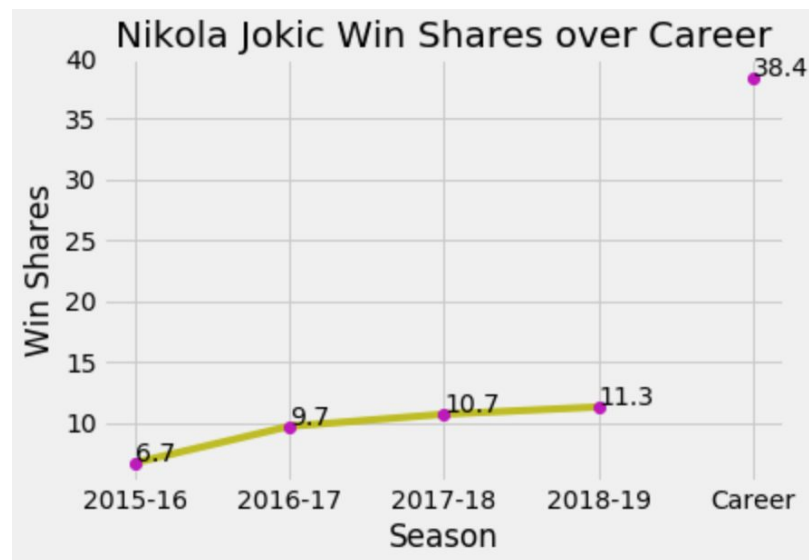


Nikola's ability to score combined with his ability to pass makes him an elite offensive threat in the NBA. He is an gifted scorer and he can clearly pass the ball and this is highlighted by his Player Efficiency Rating. His PER has consistently increased throughout the years and even since he joined the league and started logging minutes in 2015, he has shown to be a player that yields above average results when on the floor for his team.



Ultimately, teams are looking to win and Jokic ranks fifth for the 2018-2019 season in Win Shares or the number of wins a player contributes to a team. His value to the nuggets has increased over the past 4 seasons consistently and today his is one of

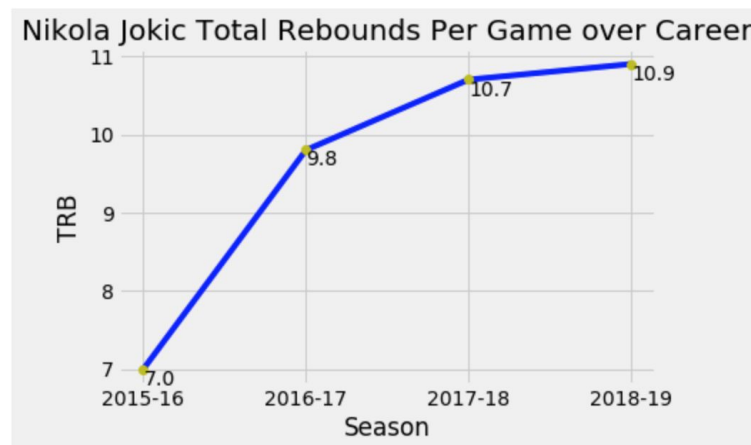
the most dominant big men in the NBA, which makes it only fitting he was named to his first All Star Game this season.

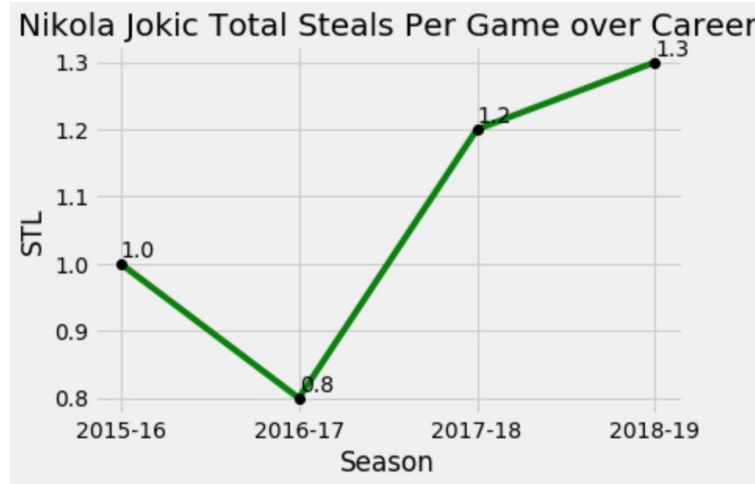


‘The Joker’ has all of the offensive tools in his tool-kit, outside of a consistent 3-point shot, as he only attempts 2.5 3-pointers a game and is averaging 0.9 3-point field goals made per game. He likes to position himself in the high post or at the 3-point line and the Nuggets will most often use him in the pick and roll. Occasionally, he will attempt a 3-pointer from the top of the key which he is shooting at 0.32 to draw his defender away from the basket. He ranks in at 21st in 2-point field goals made per game and the bulk of his points come right around the rim (*Figure 1*). He ranks 5th in Value over Replacement player and 5th in Offensive Box Plus/Minus, if I haven’t convinced you by now, you should be convinced: Nikola Jokic is an offensive powerhouse and has the skills that would benefit any and every NBA team.

As for his defense, none of his numbers jump off the page right off of the bat. He received a lot of criticism early in his career for being ‘slow-footed’ due to his massive size. However, this year he has really stepped up his defensive game. He is 53rd in blocks per game, 29th in steals and has a block percentage of 2.0% this season .

However, his Defensive Rebound Percentage ranks 12th in the league at 27.5%, his defensive win share is top 10 at 3.8 wins contributed to his defense, and his Defensive Box Plus/Minus ranks 6th in the league at saving 3.6 points per game due to defense (ranking only behind Giannis Antetokounmpo, Rudy Gobert, Myles Turner, Russell Westbrook, and Anthony Davis)...not bad defensive company. It is clear that Jokic's strong suit is his ability to impact the offense, however he is a more than competent defender who can hold his own on the floor. He has really developed his defense and he looks a lot more fluid on the floor this year compared to years prior. His steals and total rebounding have increased steadily throughout his career and he is the type of player, that values his team and will contribute on the defensive side of the ball. He likes to establish his presence down low on defense and while he doesn't rack up many blocks per game (0.9 this season). He has a good basketball IQ and puts himself in a good spot to get rebounds, however occasionally he can get lazy on defense and commit frustration fouls when things don't go his way. On the offensive end, since they use him so much in the pick and roll, he often finds himself around the basket and this year he is averaging 2.9 offensive rebounds per game, which ranks 14th in the NBA. While he is no Rudy Gobert, his defense has improved immensely this season.





In summary, I believe that Nikola Jokic is an elite NBA talent with the ability to elevate his team through his offensive skill, scoring ability, and 'grind it out' defense that many do not give him credit for. Jokic would bring immense value to any organization and has the ability to win the NBA MVP award if he continues on his impressive trajectory. In June, Jokic signed a 5-Year, \$148M Contract Extension with the Denver Nuggets, which I would also have done considering his consistency and rare ability for his size.

Notes: THJ field goal percentage is second worst in league at .393. 3.4 rebounds per game (ranks 24/40 of all qualified sg), (ranks 49/57 in terms of 3 point %), (these are from ESPN), 114/126 for TO per game at 1.6 per game. PER of 13.7 (below average)

Breakdown: Tim Hardaway Jr., SG, Dallas Mavericks, #11



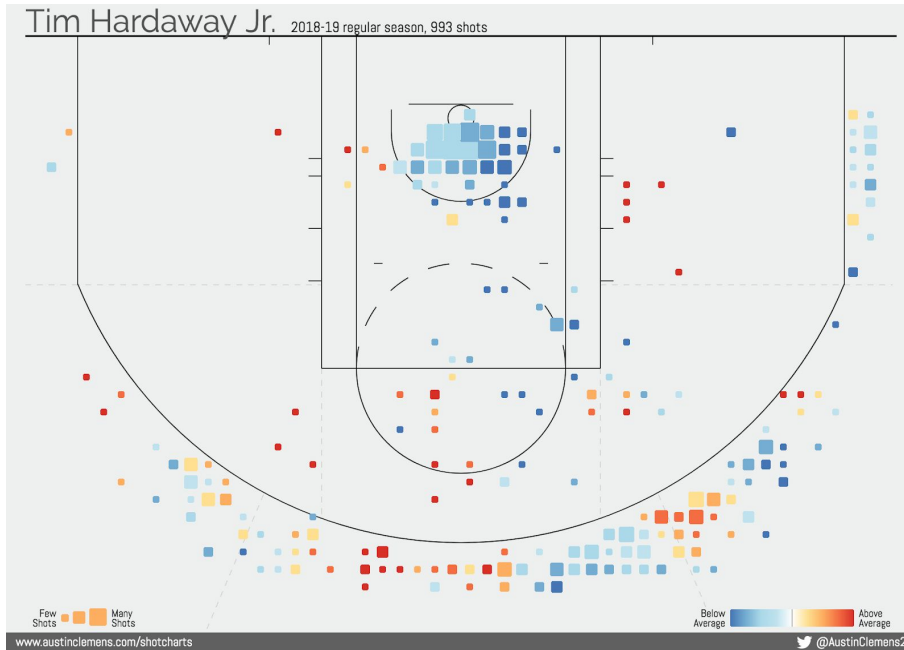
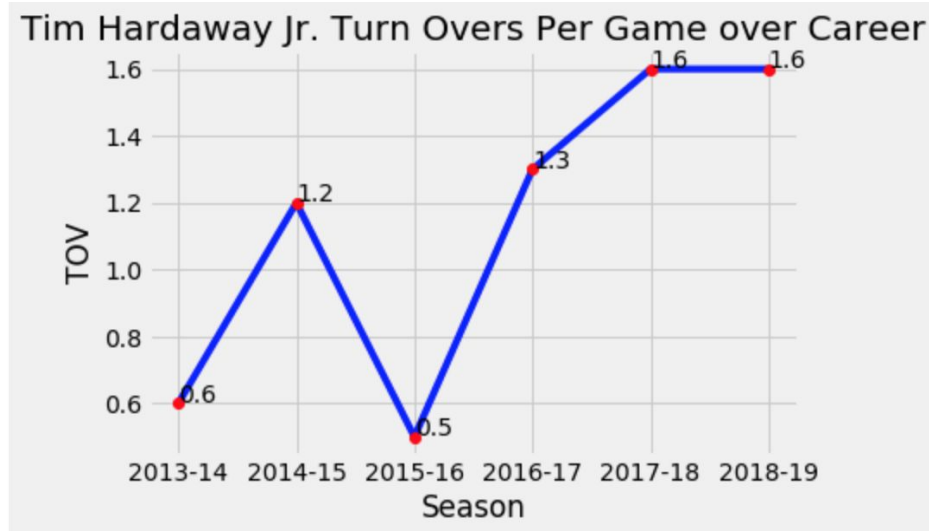


Figure 2

Sources: Basketball Reference, [austinclemens.com/shotcharts](http://www.austinclemens.com/shotcharts), http://www.espn.com/nba/statistics/player/_/stat/rebounds/sort/avgRebounds/position/shooting-guards, <https://www.youtube.com/watch?v=WZRpGHY5z4w>, <https://www.newsday.com/sports/basketball/knicks/tim-hardaway-knicks-1.16751500>

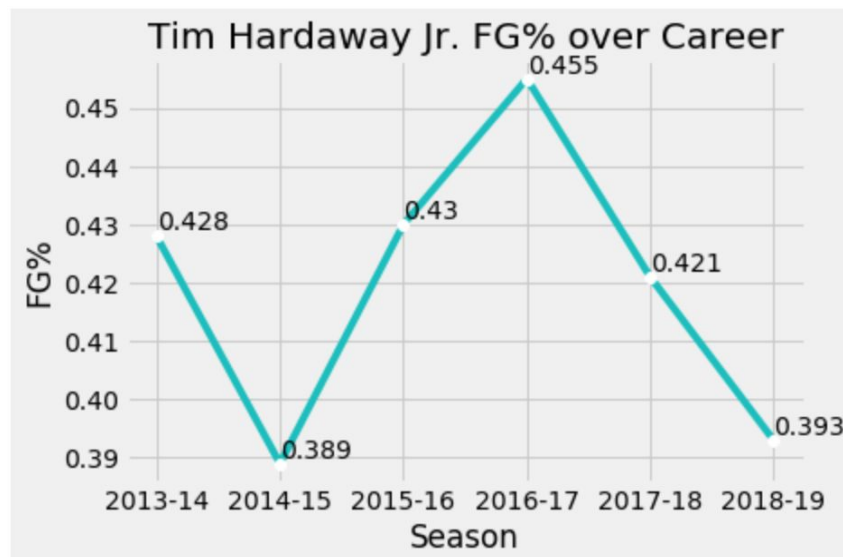
Tim Hardaway Jr. was drafted 24th overall in 2013 by the New York Knicks. Hardaway had an impressive rookie campaign with a Knicks team coming off a 54-win season in 2012. During his rookie year THJ averaged 10.2 points per game and 1.6 3-pointers made per game. After a solid rookie campaign, Hardaway was improving slightly until he had a serious lower body injury in 2015-2016 with the Hawks. During this period his numbers took a big dip and he was never quite able to get back to the trajectory he was on of being a solid number 2 or 3 scoring option on a good team. Hardaway's point totals did continue to increase, however he continued to turn the ball over at a higher rate.



From the 2015-2016 season to the 2017-2018 season THJ was contributing one full turnover more per game. For this season, before his injury a few days ago, he ranked 114/126 eligible shooting guards for turnovers per game at 1.6 per contest.

Upon leaving Michigan and entering the league, Hardaway was known as a pretty good 3-point shooter. However, he has been going through slumps and I would identify him as a very streaky shooter. At one point last February with the Knicks and I quote, "He's shooting 24-for-93 overall (25.8 percent) in that time, including an abysmal 5-for-44 on three-pointers (11.4 percent)." (newsday article). His streaky nature and inconsistency from the field is what I really don't like about THJ. You can see in the Youtube video I linked to in the sources, that shows some of his inconsistencies from his 2017 season when shooting the ball, especially when he is spotting-up. If you look at 0:14 in the video, you can see Hardaway get a pass from Courtney Lee at the top of the 3-point line, He decides way too soon that he is going to dribble once and pull-up. Paul George sniffs this out and rejects him with ease, this is just poor shot selection on THJ's part. With the Knicks, he was used a lot off ball to come off screens and get open looks. You can see at 0:42 in the video, Hardaway comes off a screen set by Lance Thomas and takes a pretty contested 3-point shot from the top of the key, which he misses. It's this decision making and his willingness to take very difficult shots that have really hurt his shooting percentage throughout his career. Hardaway was shooting 0.393 from the

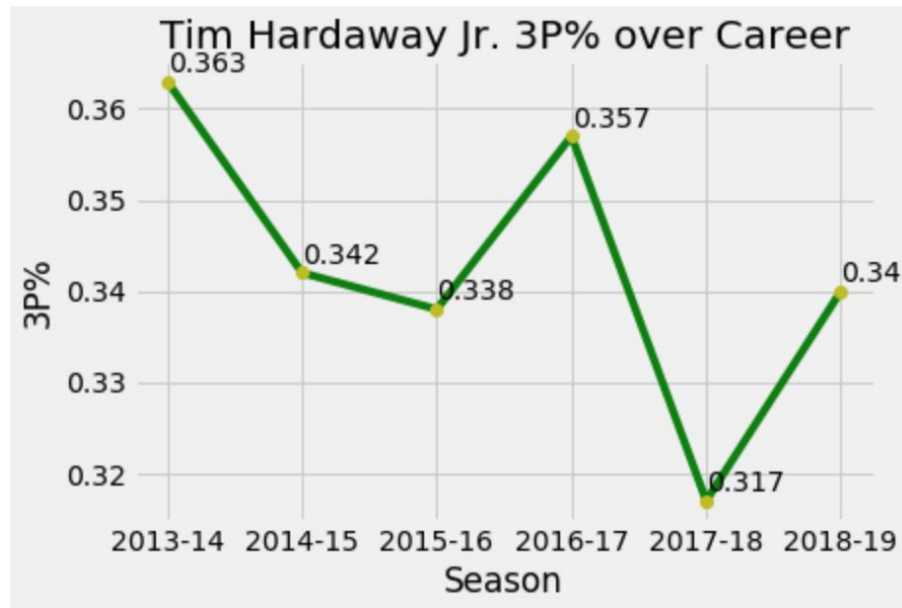
field which is the second worst in the league only behind Knicks rookie, Kevin Knox. This is a quite concerning statistic for a player that got a 4 year, 71 million dollar contract with the Knicks just a season before, who was expected to be the second scoring option on the team.



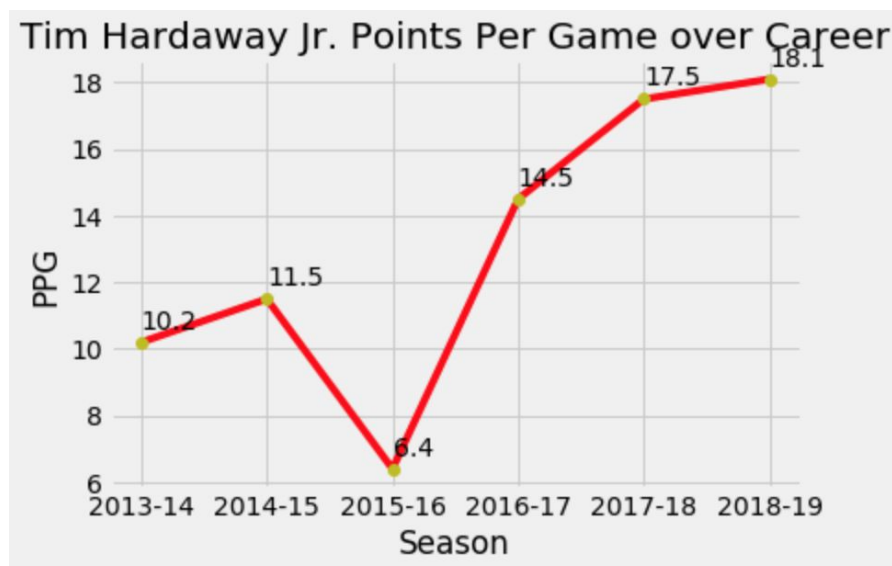
Hardaway's inability to shoot consistently is his biggest flaw today. Shooting below 40% from the field, not outside the arc, is abysmal and for a player with 5 years of experience under his belt. This is a tell tale sign to stay away from THJ. Just take a look at his shot chart from this season in *Figure 2*, he is a below average shooter from the restricted area right under the basket and ice cold from the corners. He often rushes plays and will charge into the lane to take an off-balance layup. Hardaway is athletic, but he often tried to do too much and will take bad shots late in games. For a guy that is supposed to be a scorer, he has not been living up to expectations. And his 3-point percentage is not much better.

Hardaway has shot a measly 0.34 from three this season. He ranks 49/57 of qualified SG in terms of 3 point % according to ESPN. He averages over 7 3-pointers a game and only hits 2.5. He is struggling from the field, even with layups and seemingly

routine 'close to the basket' shots as well as from three. His offense has never gotten the chance to fully blossom and at this point after dealing with another injury, his opportunities may be running out now that rookie phenom, Luka Doncic has hit the scene in Dallas. Here are his 3-point percentages over his career.

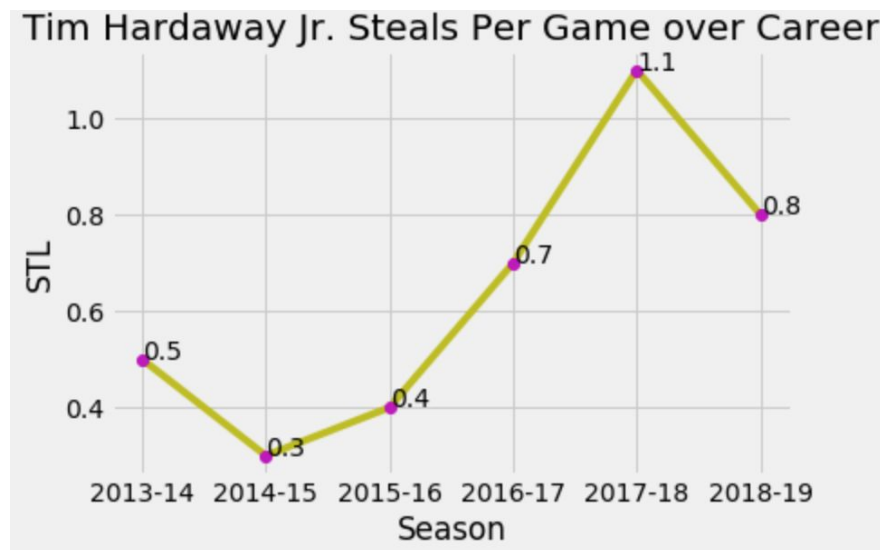


Hardaway has yet to find his way and consistently perform on the offensive end whether it is due to injuries or fit. Clearly, while hardaway has scoring talent as can be seen by his steady scoring improvements.



He is not efficient enough to warrant any team using him as a shooter. His scoring may be high, but it takes him way too many shots and he is scoring at too low of a rate to be an asset to any competitive team. His PER for this season 13.4 and has been over the 15.00 league average only one time (2016-2017). At this point, THJ just doesn't cut it as a scoring SG that I want on the floor for more than 20 minutes a game (he averages 26.1 minutes per game throughout his career).

Shifting over to his defense, it's not so great either. During his first few years he was known as a solid defender, but as he got tasked with trying to score more for the lousey Knicks and Atlanta Hawks, his defensive numbers suffered. He is ok guarding guys one on one, but his individual numbers in blocks and steals are very low. He has a 0.5 block percentage for his career and he has only averaged more than 1 steal per game one time in his career (2017-2018).



He brings very little to the defensive end as well in terms of rebounding, he averages 2.6 total rebounds over his 5 year career in the NBA. For this 2018-2019 season he is averaging 3.4 rebounds per game, which ranks 24/40 qualified SG. Being 27 years old, it does not look like Hardaway has enough left in his tank to turn things

around and ever become an elite defender, let alone a competent one. His strength at one point was scoring, and now that over the past few seasons he's seemed to have lost his touch. I wouldn't want to trade any valuable assets for a player like this, I would rather develop young players who are defense first and spread Hardaway's bad shots among other players. He was overvalued when the Knicks gave him a 4 year, 71 million dollar contract and despite leaving a dysfunctional organization like the Knicks, he has yet to turn his numbers around in any statistically significant way.

In summary, Tim Hardaway Jr. is no more than a bench player who can come in and score a few baskets (on a good day). His offensive numbers have been on the down turn and his defensive ability is not impressive enough to put up with his streaky shooting. I would not recommend any team to trade for him and I think that within a year or two, he will be phased out of the Mavericks lineup entirely or have his minutes severely restricted.

2. How would you go about developing a strength of schedule metric for the NBA?

There are a few major metrics I would definitely want to include when considering developing a strength of schedule metric for the NBA: marginal W/L records of teams, home vs. away, conference, and back to back rate/roadtrip distance. These are the essential criterion that I would like to include in my model. I also think that creating a dynamic model is way more useful for teams to use during the season, so the rate is adjusted constantly throughout the season as we proceed to get a better idea of which teams are real contenders and which are preseason pretenders.

Marginal W/L record is a super important piece to this model. W/L record is interesting, but looking at the margin that teams are winning and losing by will be more accurate to predict the strength of schedule (SOS). For instance, if the Warriors beat a team like the Hawks by 18 whereas the the Warriors beat the Rockets by 2, those wins clearly mean something different and despite both the Hawks and Rockets “losing”, the Hawks are more likely an easier team to play than the Rockets because of the margin of their loss, they were blown out whereas the Rockets may have lost on a Kevin Durant buzzer-beater. Margin of Victory/Defeat is also a great way to be able to get more specific numbers to compare teams. A team that is 10-5 that is outscoring their opponent by a total of 150 points is a stronger team than a team that is 14-1, but only outscored their opponents by 20. This metric helps make distinctions between good teams beating good teams by a little, good teams beating bad teams by a lot, and how bad the ‘bad’ teams really are relatively. I would rate this metric heavily in the overall SOS calculation and this would need to be constantly updated to display whether teams are just scraping by or winning with ease.

Next, I would want to investigate home vs. away edge and add some sort of noise factor to give the home team a slight advantage. The following graphic is from a fivethirtyeight article written by Neil Paine on May 17, 2017:

What's home-field/court/ice worth in the postseason?

LEAGUE	HOME TEAMS IN REG. SEASON		HOME TEAMS IN PLAYOFFS		PLAYOFF DIFF.
	WIN PERCENT	BOOST*	WIN PERCENT	BOOST	
NFL	57.1%	+7.0	64.7%	+11.8	+4.8
NBA	59.9	+9.8	64.5	+13.9	+4.1
MLB	54.0	+4.0	54.2	+4.0	+0.0
NHL	55.1	+5.1	55.3	+4.8	-0.3

Percentage point change from home team's expected win percentage at a neutral location. In the playoffs, better teams are awarded more home games, so expected home win percentage is higher than 50 percent.

SOURCE: SPORTS-REFERENCE.COM

During the 2017-2018 NBA season, it was determined home teams received a 9.8% edge in the regular season and a 13.9% boost in the playoffs. These numbers are significant and should definitely be factored into a teams' power rankings. Teams are more likely to win home games versus away games in the NBA. If teams are stronger at home, then playing more home games is better and it's better to play good teams at home and bad teams on the road in order to have the best chance of winning those games against the good teams. This brings up another factor that should be used when determining strength of schedule: conference. Teams in the Eastern Conference only play teams in the Western Conference twice and vice versa. It is pretty widely accepted that today in the NBA, the Western Conference has more competitive teams than the Eastern Conference. This is further supported by the current playoff races in each conference and the fact that 4 out of the last 5 NBA finals matchups were won by Western Conference teams. Since playing in the West is more difficult, those teams have a harder strength of schedule because of the number of times they have to play other competitive teams (4 times for each team in their division and 3 or 4 times for the other Western Conference teams). In summary, just by playing in the Eastern Conference, those teams would have an easier SOS compared to most Western Teams because they play the most talented teams in the NBA less. While this doesn't sound fair at the NBA league level, it's the way it is and it would be shortsighted to ignore such a reality. Obviously, both home court advantage and conference dominance would need to be adjusted throughout the season as teams begin to separate themselves and prove

that they are either a great team or just in an easier conference with worse teams that they play more often. Additionally, the impact of home court advantage changes and I would like to include a subtle 'streak' factor that could be applied as an added edge to a home team that has strung off 11 or 12 straight home wins.

Lastly, the last metric I would include is a fatigue metric tied directly to back to back games and team travel. The NBA has become increasingly better over the years at scheduling and keeping travel as minimal as possible, but some teams still get the short straw. For example, in the 2018-2019 season the Portland Trail Blazers will travel 54,333 miles whereas the Cleveland Cavaliers will travel under 40,000 miles. This traveling problem has been around the NBA since its first season in 1946-1947. I would factor in travel and more specifically time zone changes into the strength of schedule. This problem is much reduced thanks to better scheduling algorithms, but it would be naive to not admit that it could be more difficult to fly across the country from Portland to Miami given the time zone and stress of travel and play a basketball game at your highest level. Looking at back to backs, fatigue sets in after the first game. Dr. Cheri Mah, who is an NBA sleep consultant, created a MAH score which factors in travel, game frequency, recovery time and game location, among other variables to determine if one team is set to lose at a higher rate given the fatigue. While this only affects maybe a few games per team in the NBA, it still has shown to have an impact on wins and losses for teams. I would factor in this MAH score into my strength of schedule with a tiny weight, depending on the number of games where the MAH score is high enough to have been shown to have enough of an impact on the players in the game. Teams with a lot of travel and back to backs, definitely have a harder schedule than teams who have very fortuitous back to backs and travel that makes total sense when you compare the next 10 games to a map of the USA (and Toronto).

All in all, there are many factors that can play into a strength of schedule formula. I have highlighted the 3 major ones that I would investigate further, find appropriate weights, and use to determine SOS for NBA teams. The marginal W/L records of teams, home vs. away matchups, competitiveness of conference, and back to back

rate/roadtrip distances are the major factors I would use to develop SOS rankings for the NBA. I would also constantly update the SOS based upon some of the factors I highlighted earlier. Finally, it would be nice to have a model that could factor in key injuries, team 'streakiness', matchups, rivalries, and other common minor basketball adjustments that teams make throughout a season in terms of schemes and personnel.

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