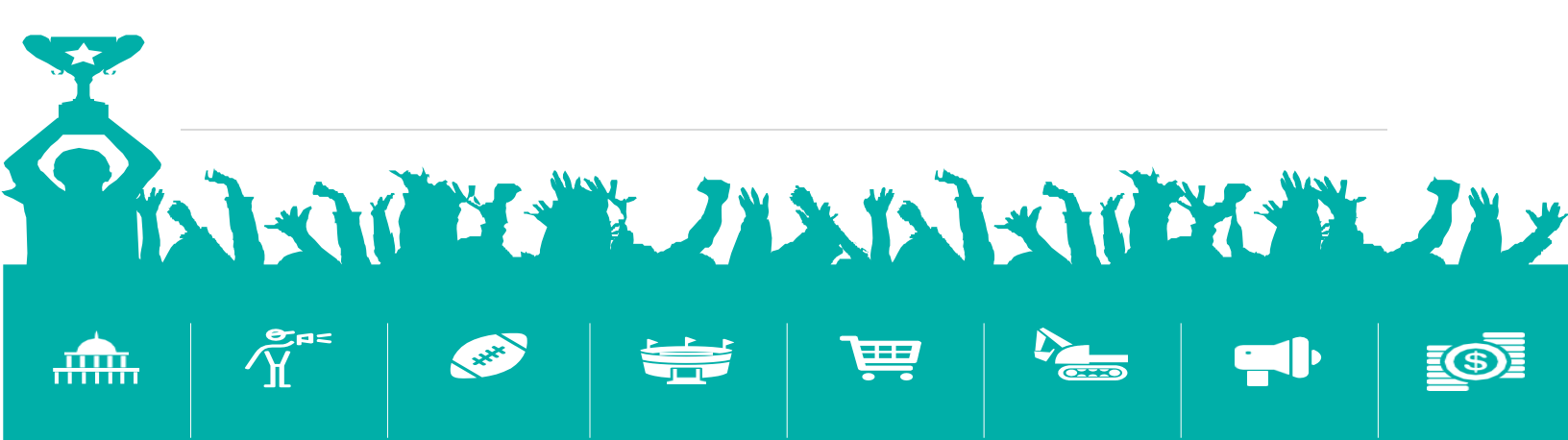# INDIAN PREMEIR LEAGUE

MSIS 2621: Dashboards, Scorecards and Visualization

Data Story Telling Report

Submitted by: Bikram Patnaik

PROJECT MOTIVATION

The Board of Control for Cricket in India (BCCI) initiated the Indian Premier League, a cricket tournament of Twenty-Twenty overs to be played among eight domestic teams back in April,2008. For the current year, team owners bid for the services of cricketers for a total of whopping US$ 60 million. The tournament being a medium for entertainment keeps children, youngsters and adults glued to the television for three consecutive months. Player are sold for fancy dollar figures which attracts the media attention, but not much is known about what goes backscreen. How exactly is the valuation of cricketers is done by the owners/selectors is still a mystery to all the cricket lovers.

In the recent IPL 2017 session, there was a bedlam between the huge auction price difference of overseas cricketers vs the domestic players. Given the data on the estimated bid prices, cricketing attributes of players, and other relevant information, I wanted to understand which attributes seem to be important or rather I would say, which parameter could be relatively crucial for a team's owner to decide a player's valuations.

 To uncover my curiosity about the topic, I analyzed data of individual attributes separately for both batsman and bowler. Using batting average, batting strike-rate, percentage of runs scored for each individual team, number of runs scored by six/four as few indicators for a batsman. Whereas, for bowlers I used bowling strike rate, bowling economy, bowling average and wickets taken, as filters for the player's performance. I tried to analyze the player's overall performance in this format.

With the auction of incumbent and new players for the IPL-2018 underway, I hope that the analysis of this kind would facilitate better understanding of player price formation and underscore the predictive value of such data driven analysis.

1. <u>INTRODUCTION</u>

The Indian Premier League (IPL), a tournament modelled on the lines of National Basketball Association (NBA) of USA and the English Premier League of England, made its debut in India in April 2008. IPL is a professional Twenty-Twenty cricket league, launched by Board for Control of Cricket in India (BCCI) and has the backing of International Cricket Council (ICC). The tournament is played among eight teams, where twenty overs are bowled by each team in any given match. The eight teams represent eight different cities of India, the franchisee rights of which are auctioned-off for ten years to successful bidders. Some of these successful bidders include industrial houses such as Reliance Industries and United Breweries.

The first round of the tournament is played on a double round-robin basis, where each team plays the other seven teams at home and away. The top four teams play the two semi-finals, followed by a final at the end. This makes for 56 league matches, two semi-finals, and a final match. Thus, the tournament involves a total of 59 matches of twenty-twenty overs each, to be played among eight teams. While eleven players take the field in a match, each team maintains at least sixteen players. Five of the teams have a designated icon player, who is paid an amount fifteen percent higher than the highest paid player in that team. The icon players belong to the regions that the team represents. The principal behind icon players is that an iconic player from the vicinity of home city would be able to generate keen interest in the team and for the tournament. *Each team can buy a maximum of eight overseas players; however, only four would take the field in a match.*

Given the above ground rules, the franchise owners formed their teams by participating in an auction of the cricket players organized by the IPL authorities. The prices received by the players varied quite significantly. For example, among the highly prized Indian cricketers, Yuvraj Singh topped the list with a price of US $1.1 million, and at the other end, international players like Ben Stokes received US $2.24 million.

Such sky-high payments between players pose the questions - What cricketing attributes and other factors are implicitly decisive in the final bid prices? And, among these attributes, which are valued more than the others? With all above said, with my analysis I'm trying to find an answer to a specific question:

## "HOW ARE BIDDING PROCESSES DECIDED? AND WHICH PLAYER IS VALUED MORE?"

2. **Data Collection and Methodology**

The data sets include auction prices and player statistics for professional cricketers who participated in the Indian Premier League. The years included in the data begin with the first IPL auction that occurred in February 2008 and end with the most recent auction that was conducted in February 2017, that gives us a span of 10 years. Most of the data was compiled using *ESPNcricinfo*, which is a news website devoted to cricket. All the player statistics were acquired from *ipl20*, which is the official league website for and acts as a database for historical players as well. In addition to *ESPNcricinfo* sources like *Wikipedia* and two cricket blogs, *cricketcurrent* and *islandcricket*, were also utilized to get complete data on the IPL auctions. All these data were scrapped online using *import.io,* a web-based platform for extracting data from websites without writing any code. As a user, I entered the required URL and the app attempts to automatically extract the data that it thinks you need, but it did not provide exactly what I needed, instead a point and click interface helped to "train" the app what to extract. The data collected is stored on *import.io's* cloud servers and can be downloaded as CSV, Excel, Google Sheets, JSON or accessed via API. In this way, I could extract thousands of data sources regarding players simultaneously.

Further, I wrote a python script on *jupyter* environment to drop certain columns from the bowling and batting dataset that didn't contribute to my analysis and renaming certain attributes made it easier to join multiple data sources on common parameters. Additionally, there were some players who had few player statistics that were missing. However, there were kept in the dataset and the missing information was filled in using the mean statistics from the rest of the sample. This was done to ensure a larger sample size and more meaningful results.

In theory, the auction data set might be expected to contain 685 observations, however due to incomplete information for some of the players mainly related to either their base or bidding prices during the auction,17 observations were dropped from the data set. This brought down total observations to 478 for the 10-year period. There were few players who weren't auctioned for a particular year, so their evaluation was considered to be equivalent to the base price of that player for the same year.
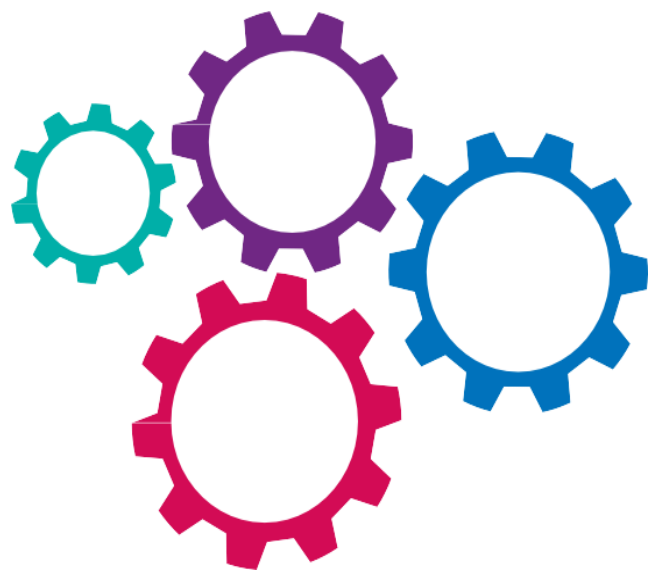
3. ANALYSIS

In this section, I have tried to compare and contrast several attributes of Indian and Overseas players for the past decade. To keep things simpler, I have broken down the analysis into two different categories- Batting and bowling. Let's dive deeper into each of this segment and find answer to my main question.

3.1 *BATTING:*

a) Batting Strike Rate:

Batting strike rate in cricket is defined for a batsman as the average number of runs scored per **100** balls faced. The higher the strike rate, the more effective a batsman is at scoring quickly. But in T-20, being a shorter format, keeping a higher strike rate puts the batsmen in a category of fast 'run-scorers'. This makes them crucial for the team as your aim is to collect as much runs as possible in limited over.
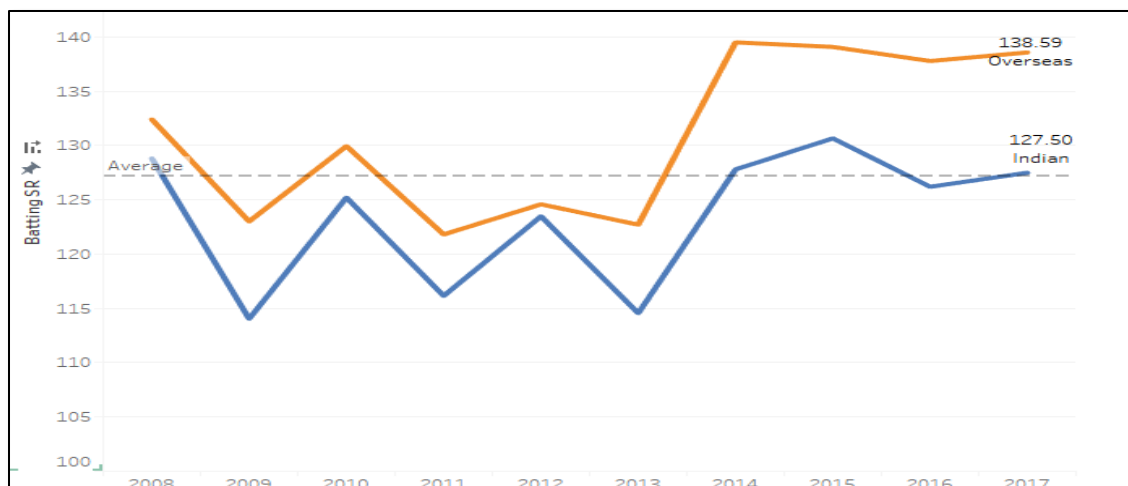

Fig 1: Trend showing Batting strike of Overseas vs Indian batsman

From this simple line graph, we see that in the recent year of 2017, Overseas batsmen have an average strike rate of 139 which is much higher compared to their Indian counterpart, whose strike rates have always been a concern. This indicates that the overseas players are better in scoring quick runs making them more desirable for owners to win them matches.

'Overseas batsman are quick run scorers as compared to domestic players'
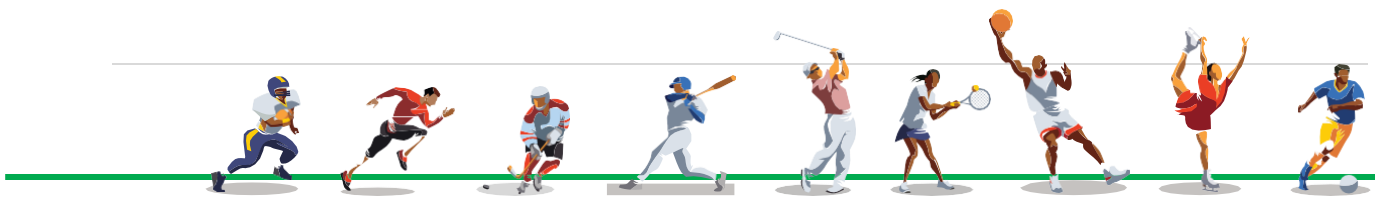
b) Batting Average:

A batting average represents how many runs, on average, a batsman scores before getting out. The higher the batting average, the better the batsman's ability to score runs without getting out. Batting Average: Runs divided by (number of times out) = Runs divided by (Innings - Not Outs). In an IPL-T20 innings, a batsman is expected to stick to the batting crease and score maximum runs for his team. This helps the side to put up a target score on the scoreboard to be chased by the opponent. For a team's owner, having this attribute in a player is crucial, making sure that the team maximizes its chances to win in each game.
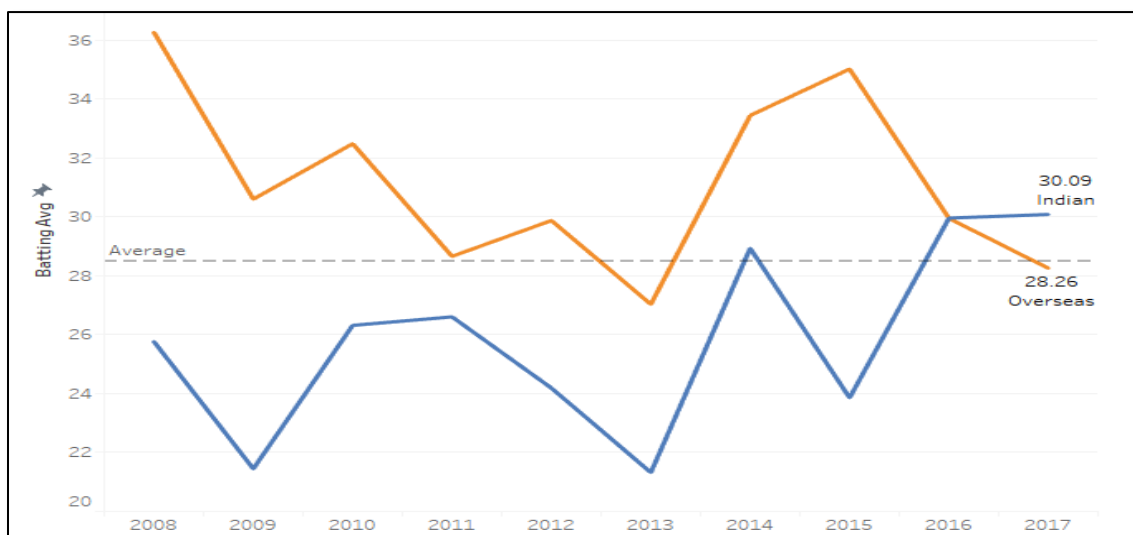

Fig 2: Trend showing Batting Average of Overseas vs Indian batsman

The line graph in Fig 2, suggests that Indian players have a better batting average (30.09) than the overseas player. But the difference seems to be barely minimal. I tried to understand the data even further by analyzing the number of matches played by both the category of players. On representing the trend of matches played on a bar graph, we can see that Overseas cricketers always play less number of matches as compared to the Indian players (because of the IPL rule that I mentioned in Introduction part: only 4 overseas players can play for each team in any given match). This infers that given the same opportunities of playing equal number of matches the Overseas players will outshine the latter.
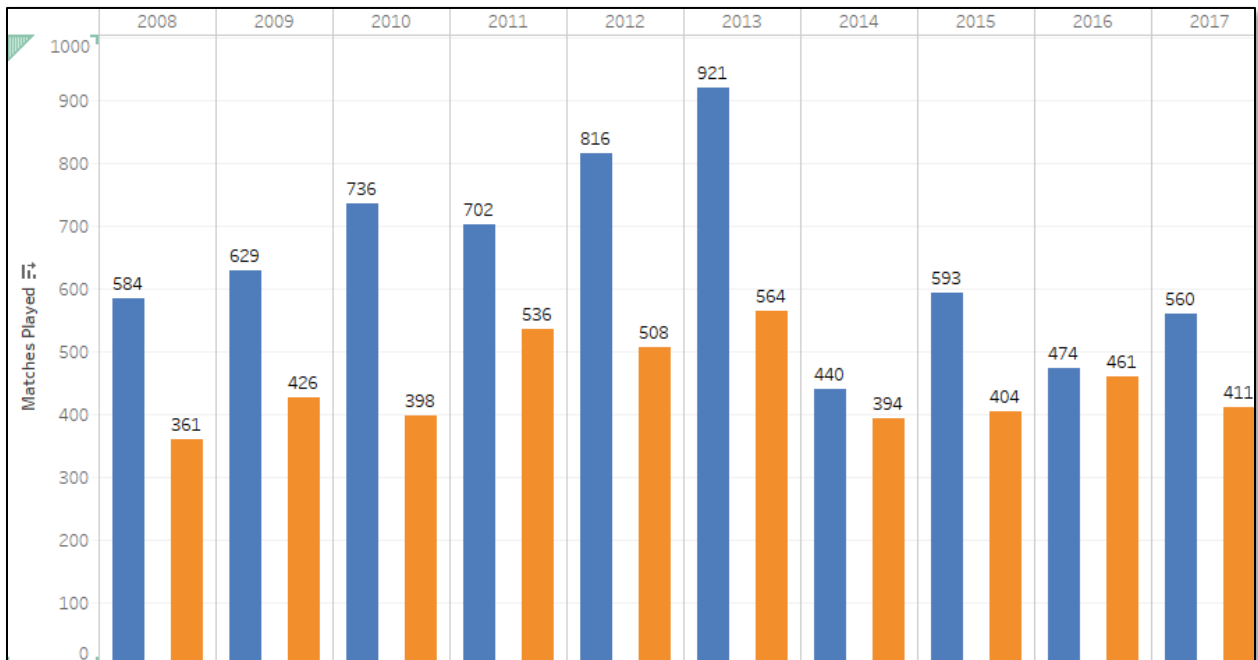
Fig 3: Bar graph comparing matches played by Overseas vs Indian batsman for 10 years. Blue=Indian, Orange= Overseas player

'Overseas batsman can score more runs in a match before getting out'

c) Runs scored by hitting a Six (or Four):
Six runs are scored if the batsman hits the ball and it does not bounce before passing over the edge of the field in the air and four runs are scored if the ball bounces before touching or going over the edge of the field. The scoring a six/four by a good aggressive shot displays a certain amount of mastery by the batsman over the bowler, and is usually greeted by applause from the spectators. Owners of the team look for such characteristics in a batsman to attract more crowd to the venue and keeping them entertained throughout the match. This not only ensure high revenue generation for the team (in the form of tickets sold) but also creates a huge fan following for that player, thus strengthening the brand name for the team franchise.
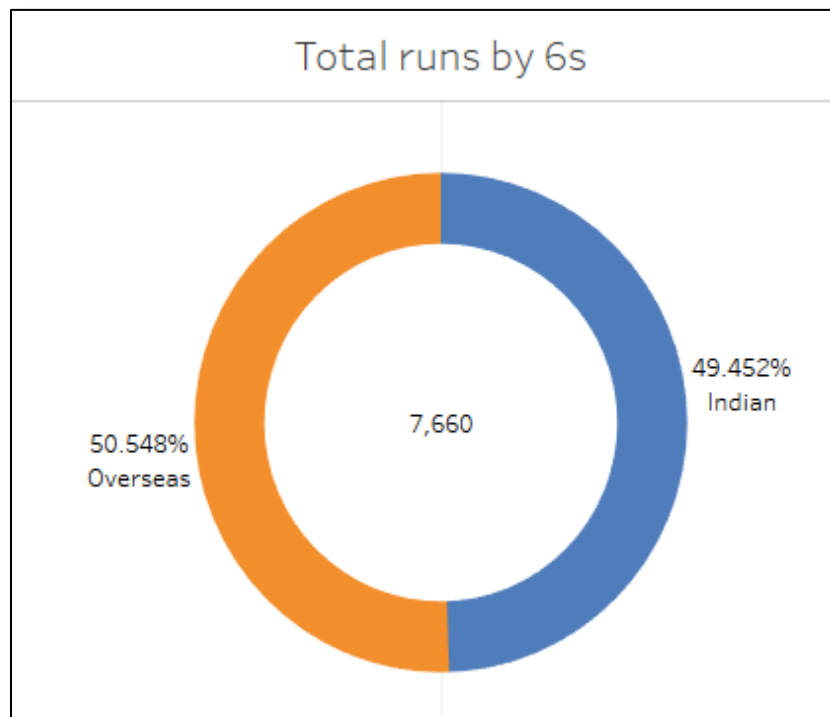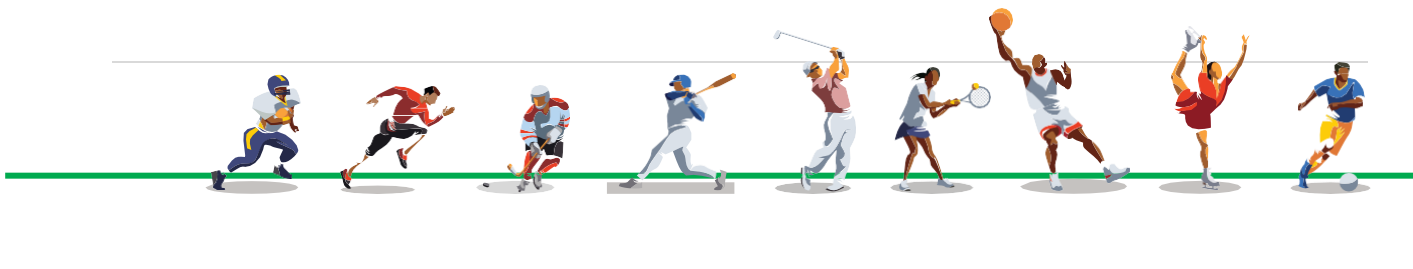
Fig 4: Donut chart shows the % of runs scored by six by Overseas vs Indian batsman (Blue=Indian, Orange= Overseas player)

'Overseas batsman are great hitters, pull more crowds and revenue for the game'

After analyzing the batting section and reviewing all the key attributes of a batsman, I would now like to put forward my **claim considering the team selectors/owners as my audience**:

"CLAIM: OVERSEAS BATSMEN SHOULD BE PRICED HIGER IN IPL BIDDING PROCESS"

Article from ESPNcricinfo acts as a warrant to support my claim and also my reasoning in Fig1 & Fig 4. Source: http://www.espncricinfo.com/magazine/content/story/585560.html

October 5, 2012

Dhoni's batting problems in T20s

S RAJESH

56 💬 Share on Facebook   Share on Twitter

His strike rate is surprisingly low because he faces too many dot balls and doesn't hit enough boundaries

All stats updated till October 3, 2012

A couple of days ago, Aakash Chopra, one of ESPNcricinfo's regular columnists, tweeted: "Just stumbled upon Dhoni's strike rate in Twenty20 internationals - it's less than 110. Unbelievable, isn't it?"

All those who have seen MS Dhoni the ODI batsman in full flight will react similarly when
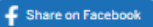

Kings XI Punjab v Royal Challengers Bangalore, IPL 2017, Indore   April 10, 2017

ABD can 'roll on the floor hitting sixes'

ESPNCRICINFO STAFF

15 💬 Share on Facebook   Share on Twitter

Current and former players were among those in awe of another stunning innings from AB de Villiers

David Warner ✓
@davidwarner31   Follow

Boooooom seriously amazing striking @ABdeVilliers17 best in the business 👏 👏
9:08 AM - 10 Apr 2017

↩ 🔁 1,504   ❤ 6,708   ⓘ

Morne Morkel ✓
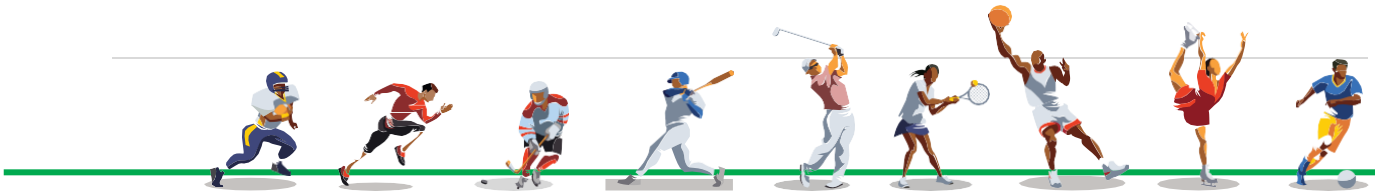@mornemorkel65   Follow

ABD ABD ABD...!!! If I was a commentator I'd do a mic drop and enjoy the show ... No words can describe @ABdeVilliers17....wow!! 🏅
9:18 AM - 10 Apr 2017

↩ 🔁 1,421   ❤ 6,342   ⓘ

Twitter reactions posted on ESPNcricinfo acts as a strong warrant to my claim. Source: http://www.espncricinfo.com/indian-premier-league-2017/content/story/1091663.html

3.2 **_BOWLING:_**

a) Bowling Economy:

The economy rate for a bowler is the average number of runs conceded for each over bowled. A lower economy rate is preferable – it means that the bowler can get more batsmen out with fewer balls. The shorter forms of the game (ODI and T20) demands that bowlers (and fielders) restrict the flow of runs from the opposition to give their team a better chance of finishing the game with more runs on the board.
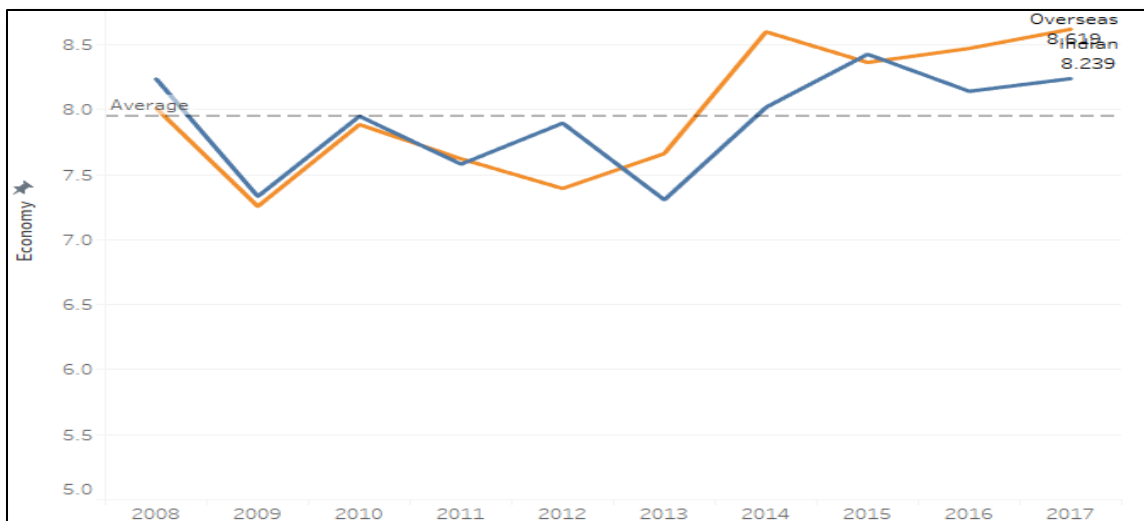
Fig 5: Trend showing Economy rate for Overseas vs Indian bowlers (Blue=Indian, Orange= Overseas player)

Analyzing this line graph, we see that by playing matches in home grounds Indian bowlers have an advantage over Overseas bowlers with a relatively lower economy rate. For an owner, this skill in a bowler is important as it allows the team to restrict the opponent to a marginable score by getting the wickets of opponent batsman.

'Indian bowlers are better in halting the batsman in charge from scoring runs'

b) Bowling Average:

The bowling average is one of a number of statistics used to compare bowlers in the sport of cricket. It is the ratio of runs conceded per wickets taken, meaning that the lower the bowling average is, the better the bowler is performing. The bowling average is commonly used alongside the economy rate and the strike rate to judge the overall performance of a bowler.
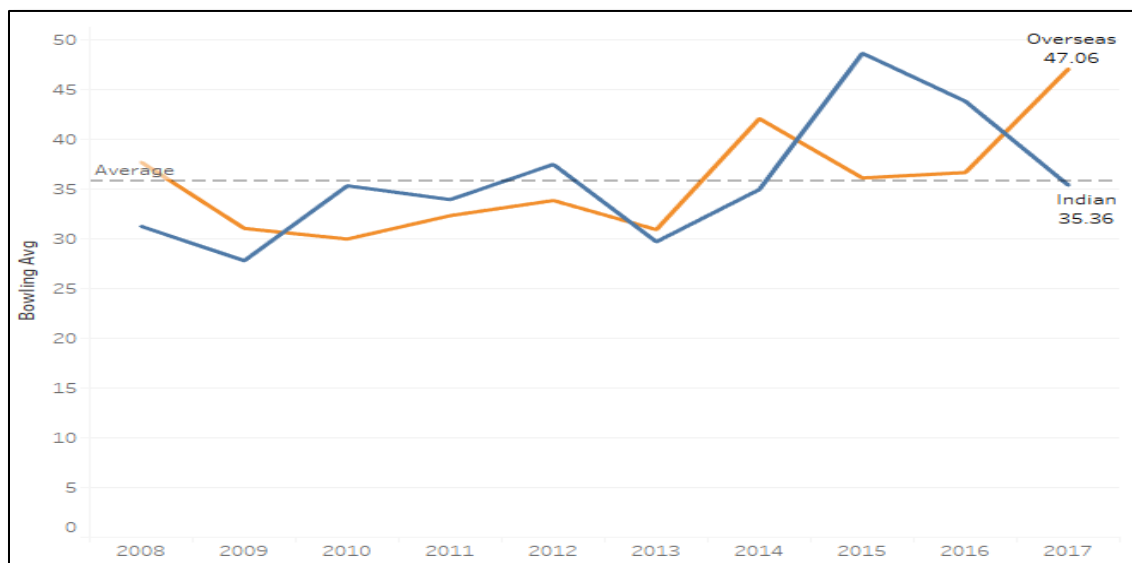

Fig 6: Trend showing Bowling Average for Overseas vs Indian bowlers (Blue=Indian, Orange= Overseas player)

From this graph, it seems that Indian bowlers prove to be excelling in the bowling department as compared to Overseas players. Having lower bowling average and economy makes them desirable for team franchise owners. *Though not to forget, if a bowler has taken only a small number of wickets, their average can be artificially low, and an increase in wickets taken can result in large changes in their bowling average.* But as per our analysis:

'Indian bowlers are good team performers with lower bowling averages'

c) Number of Wickets Taken:

In the sport of cricket, the wicket is one of the two sets of three stumps and two bails at either end of the pitch. The wicket is guarded by a batsman who, with his bat, attempts to prevent the ball from hitting the wicket. Losing a wicket refers to a batsman getting out. If dismissed by a bowler, the bowler is said to have taken his wicket. The number of wickets taken is the primary measure of a bowler's ability, and at time plays a crucial role in winning a match.
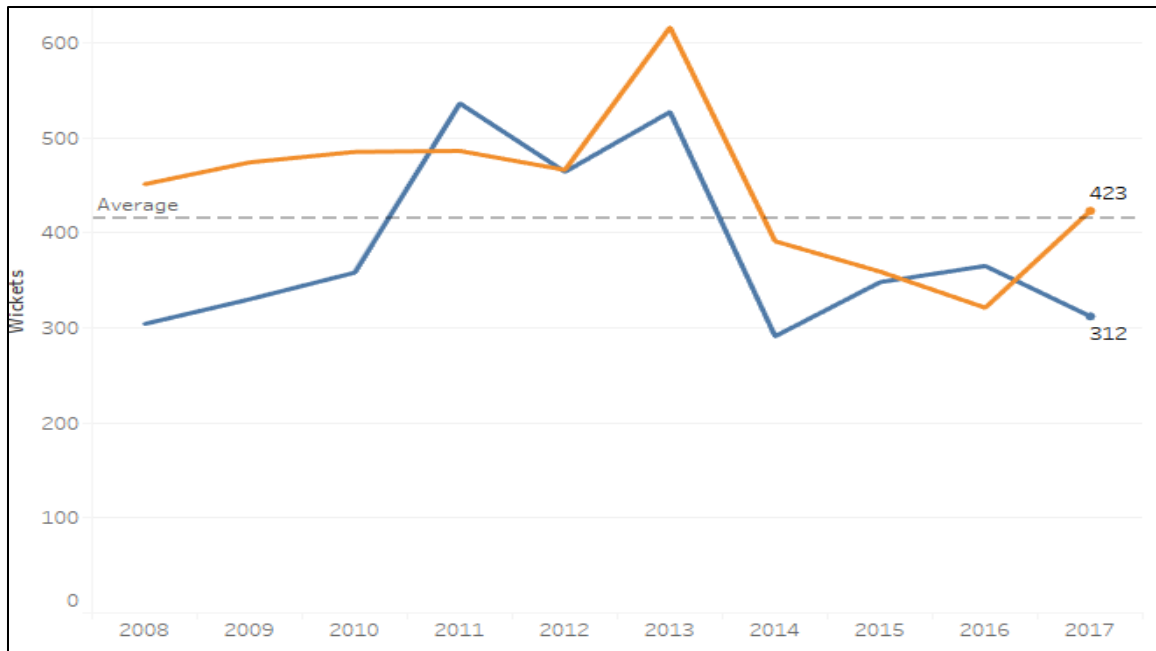
Fig 7: Trend showing wickets taken by Overseas vs Indian bowlers (Blue=Indian, Orange= Overseas player)

The trend shows that Overseas bowlers can take more wickets for the team as compared to Indian bowlers. One of the main reasons for this is that Indian bowlers lack speed and pace in their bowling style. On the other hand, overseas bowlers like Tymal Mills and Kagiso Rabada use their pace to claim more number of wickets and make each of their balling delivery unplayable- This is what the team owners want!!

'Fast Overseas bowlers claim more wickets making them lethal for the batsman'

Even though for a bowler, bowling average and economy rate matters, but what matters more in cricket is a bowler's ability to collect wickets and contribute to the team's victory. Keeping this is mind, I would now like to put forward my second claim for the same audience:

"CLAIM 2: OVERSEAS FAST BOWLERS CAN BRING YOU THE CUP. THEY ARE VALUED MORE IN AUCTION"

IPL 2017: Mitchell Johnson explains why Indian bowlers can't bowl fast

The Australian also revealed an interesting Matthew Hayden story.

by **Somesh Chandran**
News / 3 May, 2017

Johnson celebrates the fall of a wicket

Article from sportskeeda supports my claim and supports my reasoning in Fig7. Source: https://www.sportskeeda.com/cricket/ipl-2017-mitchell-johnson-explains-why-indian-bowlers-cant-bowl-fast

Article from hindustantimes acts as a warrant to my claim for pace bowlers being priced more. Source: http://www.hindustantimes.com/cricket/ipl-quick-fix-fast-bowlers-the-hot-picks-at-indian-premier-league-auction/story-V20THAGJ2KXpdmmrmic4rK.html

IPL quick fix: Pace bowlers the flavour at Indian Premier League auction

IPL auction has seen franchises chase fast bowlers with England's Tymal Mills and South Africa's Kagiso Rabada getting excellent deals. Ishant Sharma one prominent name who went unsold in the first round of bidding but unsung Indians got excellent deals.

CRICKET   Updated: Feb 21, 2017 07:37 IST

HT Correspondent
hindustan times

3.3 *AUCTION PROCESS:*

The auctions for Indian premier league often draw as much attention as the tournament itself as it is at this time that the franchisees have the opportunity to build their teams for the year's tournament. The players are divided into groups based on the role they perform – batting, bowling, wicket keeper and all-rounder. The auctioneer will announce each player's name and franchises will start the bidding from their respective base price. To raise their price, team representatives will have to raise their paddles. The team that makes the highest bid, gets the player. In case there are no bids, the players go unsold and returns to the auction again with their base price reduced to half.
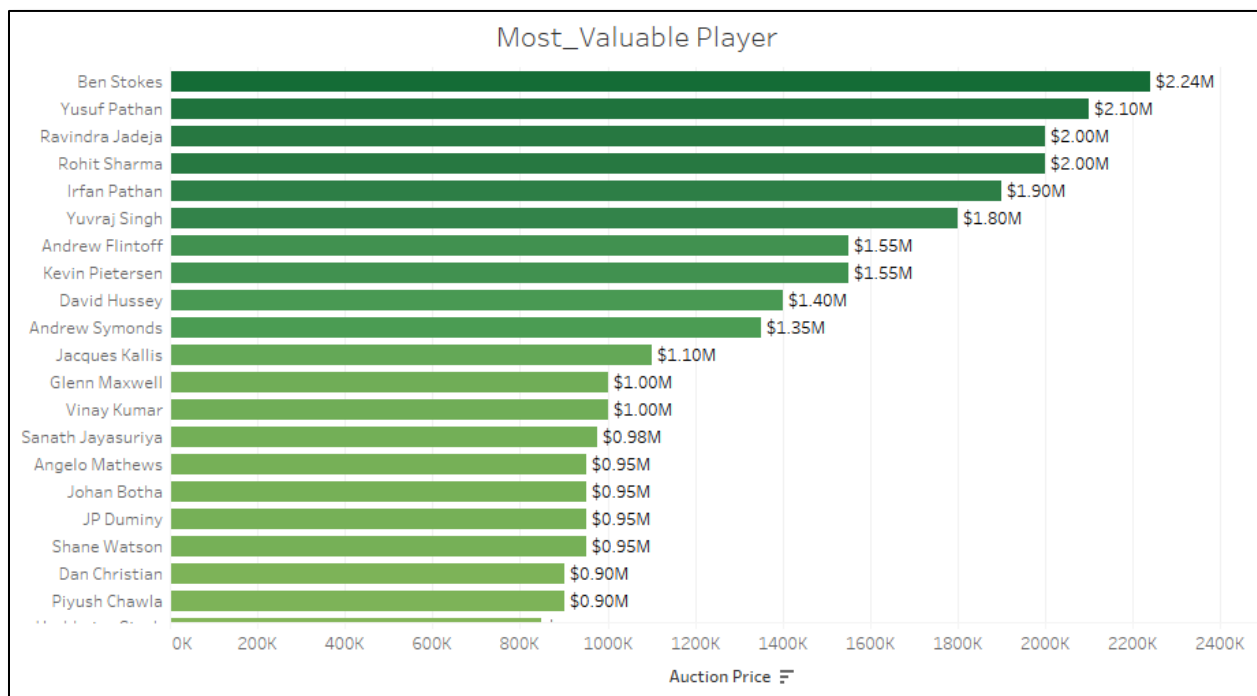

Fig 8: Horizontal bar chart showing the most valuable players and their expected auction prices.

In cricket, for the owner to be willing to bid high price for you it's not only important to be a good batsman or a class bowler, but to be a champion all-rounder. From this graph, we see that international players like Ben Stokes stands on top of the chart and is valued high in the IPL auctions. This is primarily because he can perform well in all sections of this shorter format of cricket- batting, bowling, and fielding. Not only Ben Stokes but overseas players like Tymal Mills and Trent Boult where the most sought out players by the team franchise owners for the same reasons.

All the following new headlines and official tweets reaffirms my arguments regarding the criteria for Ben Stokes in the IPL auction process.

IPL 2017: Ben Stokes' innings is one of the best in T20 cricket, says Daniel Christian

Daniel Christian stated that with Ben stokes hitting the ball well the other batsman could play calmly.

672 SHARES

f Facebook   y Twitter   8+ Google Plus

By: Express Web Desk | Published: May 2, 2017 4:39 pm

MOST READ

WBBSE Madhyamik results 2017 announced on Saturday at wbresults.nic.in

ICC Champions Trophy warm-up: Fahim Ashraf's knock of 64 guides Pakistan to two wicket win over Bangladesh

Source:
http://indianexpress.com/article/sports/cricket/ipl-2017-10/ben-stokes-innings-is-one-of-the-best-in-t20-cricket-says-daniel-christian-4637217/

IPL - Indian Premier League ✔
about 2 weeks ago

VIDEO: Mr. Unbelievable - Ben Stokes special on the boundary ropes... This one definitely in the running for the best catch of the season. You could watch this on repeat Rising Pune Supergiant #IPL

👍 25K   💬 116   ➤ 347

Source:
http://indianexpress.com/article/sports/cricket/ipl-2017-10/ipl-2017-dd-vs-rps-ben-stokes-takes-a-stunner-on-boundary-ropes-watch-video-4653751/

Mohandas Menon ✔
@mohanstatsman

y Follow

Ben Stokes' worth as a player...
1. Fielder (50%)
2. Batsman (35%)
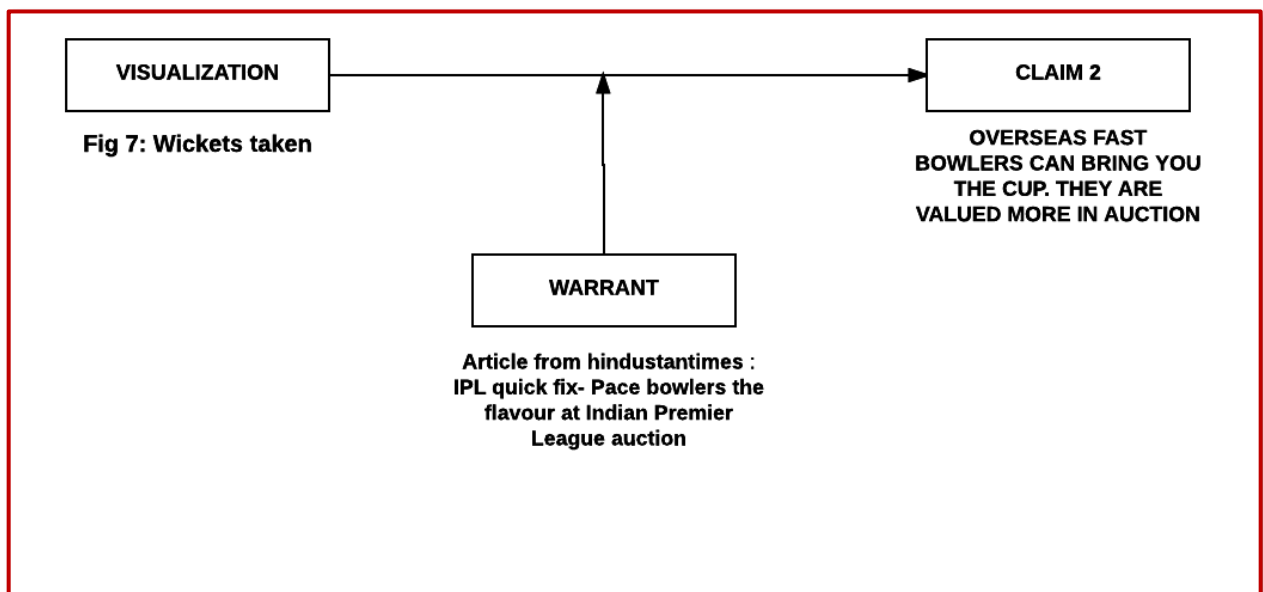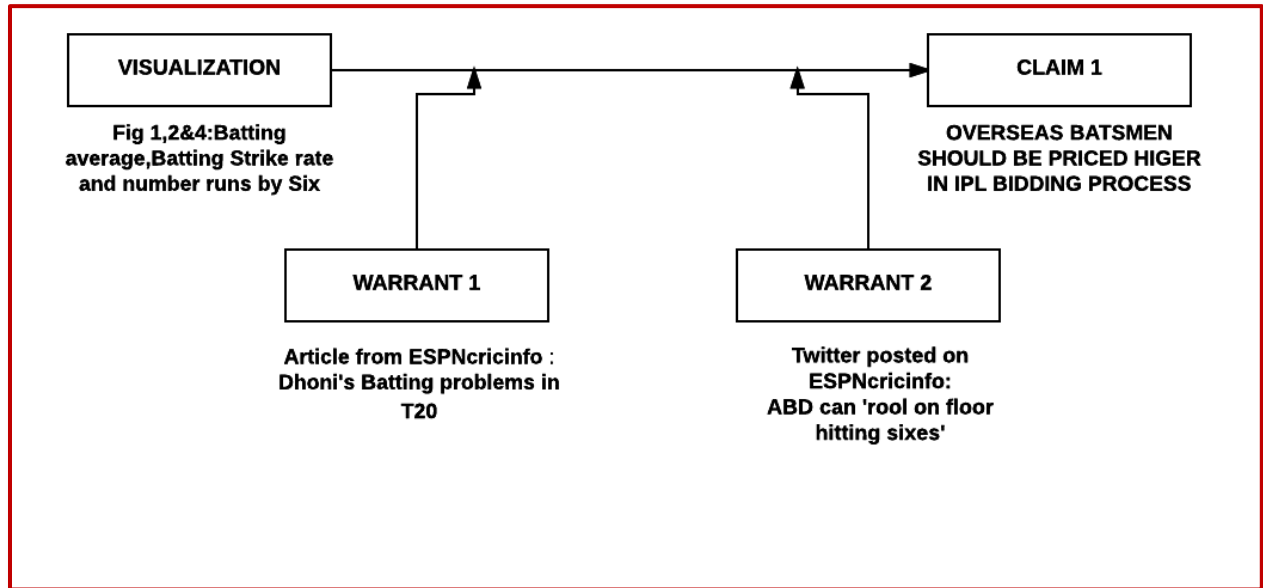3. Bowler (15%)#IPLAuction
9:07 PM - 19 Feb 2017

↩   ↻ 79   ♥ 194

Source:
http://bleacherreport.com/articles/2693948-ipl-auction-2017-list-of-sold-players-and-highest-bids

DATA VISUALIZATION FRAMEWORK

VISUALIZATION

Fig 1,2&4:Batting average,Batting Strike rate and number runs by Six

CLAIM 1

OVERSEAS BATSMEN SHOULD BE PRICED HIGER IN IPL BIDDING PROCESS

WARRANT 1

Article from ESPNcricinfo : Dhoni's Batting problems in T20

WARRANT 2

Twitter posted on ESPNcricinfo: ABD can 'rool on floor hitting sixes'

VISUALIZATION

Fig 7: Wickets taken

CLAIM 2

OVERSEAS FAST BOWLERS CAN BRING YOU THE CUP. THEY ARE VALUED MORE IN AUCTION

WARRANT

Article from hindustantimes : IPL quick fix- Pace bowlers the flavour at Indian Premier League auction

PROJECT CRITIQUE:

1. Given the time deadline, the scope of the project was restricted only to batting and bowling sectors. As future improvement to this project, parameters like fielding skills, bowling speeds, fitness level etc. can be studied for each player and further be visualized.
2. As few of the players are new findings for this league, their stats/records as well as estimated auction price would not be included in this analysis. As a result, an average auction price was assumed.
3. The visualization needed to be more interactive and dynamic in nature. For example, if we select a batsman/bowler in the current version of the viz, you would be able to see their statistics only if the player is in their respective top batsman/top bowler chart. As an improvement, I wanted to select any player in random and see his induvial performance.
4. In the visualization, all the records are gathered aggregating stats over a decade's time. Further, a bonus filter can be incorporated which would give a dropdown selection option to visualize the stats on an individual year basis.

CONCLUSION:

This project examines and tries to estimate the value of various characteristics that go into defining a cricketer. Here the price defines a cricketer he gets sold at during the IPL auction process. The analysis suggests that there are some performance criteria that players can improve to be more highly valued. The analysis finds that both batting statistics and bowling performance are important for evaluation of a player. In addition to this, it appears that overseas players are certainly performing better in certain areas of cricket and within short period of time they will get adjusted to the Indian pitch conditions. The limitation of the study is that while the analysis employed does explain some amount of variation seen in the results it also leaves a lot to be desired. This suggests to me that cricket may need some better performance criteria that are able to explain variation in player prices.

COMMENTS:

Following are the links to data file and visualization:

Tableau Public Link: https://public.tableau.com/shared/4Q2MYMFPX?:display_count=yes

Github Link: https://github.com/bikramptnk095/Indian-Premier-League_Viz-Project