

# Advanced Real Plus Minus



Syracuse University Soccer Analytics Club

## Abstract

Real Plus Minus (RPM) is an advanced statistic used in major team sports that was created to assess a player's true value to their team. While standard box plus minus statistics factor only the score differential while a player is on the court/field, RPM accounts for the level of supporting talent and competition. For this project, we wanted to not only expand this popular metric to soccer but incorporate various statistics in addition to goals that highlight a player's added contributions to their team. This advanced version of RPM serves as a holistic measure of the impact a player has on a game. To calculate the metric, we employed a ridge regression using data from the 19-20 Premier League season.

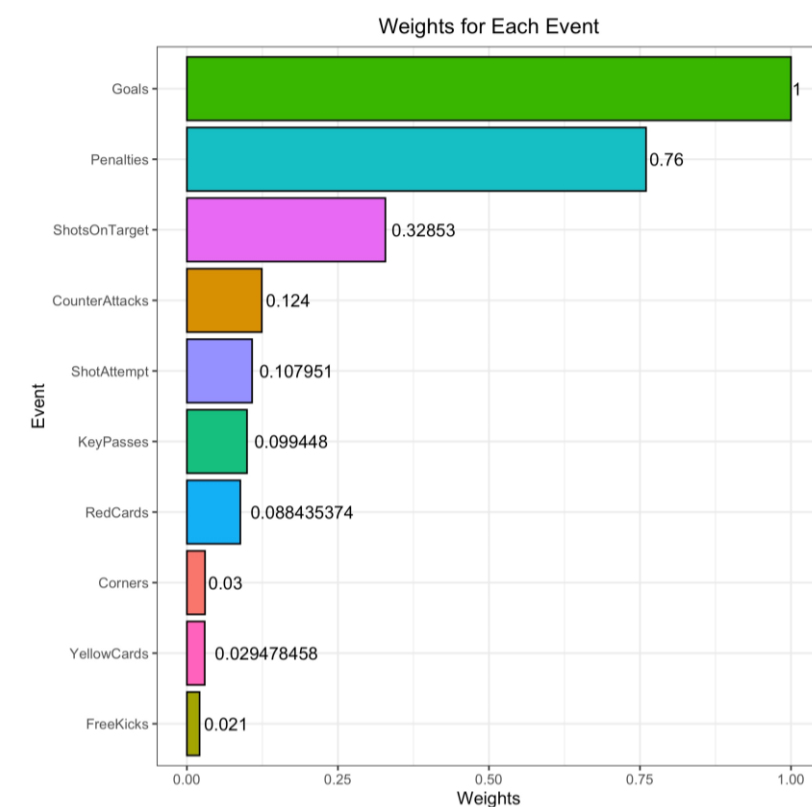
## Methodology

Using lineup and stint data for the Premier League, we ran multiple ridge regressions, predicting various in game statistics.

Each ridge regression provided a coefficient value for every player that showed the players impact on the game regarding that statistic.

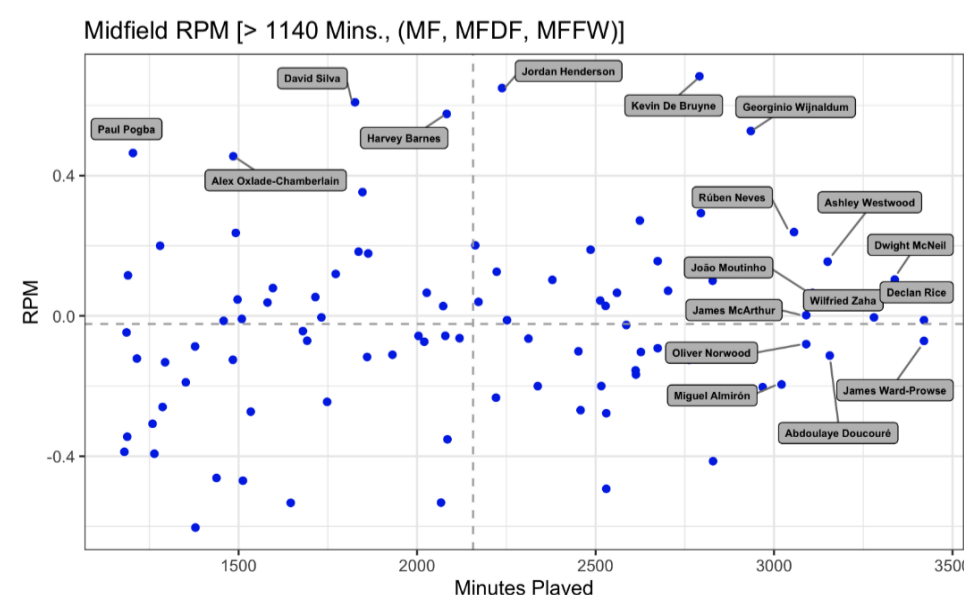
We used these coefficients to create a weighted sum that would be a player's RPM. We used offensive statistics for a players Attacking RPM and defensive statistics for a players Defensive RPM. A player's holistic RPM was the Attacking RPM plus their Defending RPM.

We weighed each event based on their "goal value" which is how likely that event is to result in a goal scored or allowed for a team. These weights can be seen on the graph on the right



## Attacking vs Defending vs Midfield

Attacking players should value their attacking RPM more, and defensive players should value their defensive RPM more because each is tailored to their respective jobs. Since midfielders contribute to both attack and defense, the overall Advanced RPM is a better metric for that position grouping.

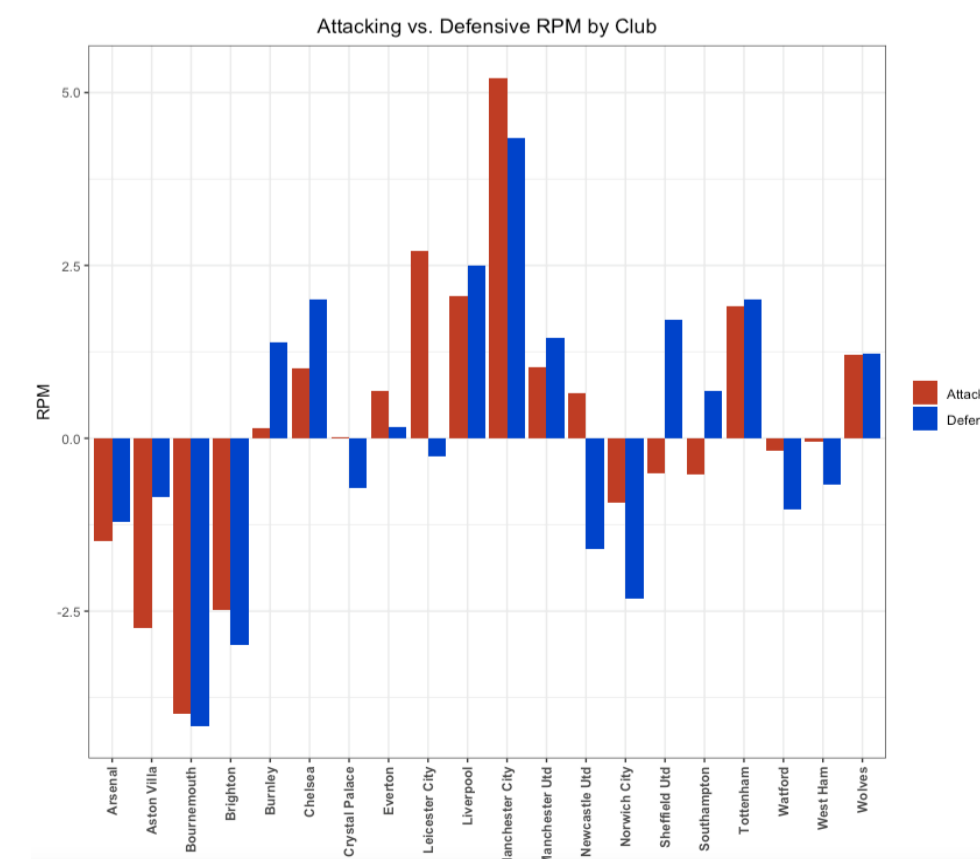


## Application and Usage

Our Advanced RPM statistic can aid managers in scouting younger and overshadowed players that do not get the recognition they deserve. The Advanced RPM incorporates unique statistics that will give coaches an edge in talent scouting and acquisition, identifying players that are providing more for the team than shown by simply goals, assists, shots, etc.

The Advanced RPM Statistic can also be utilized in lineup decisions by acknowledging which players are best with another under any given circumstance. With the number of substitutions allowed per game growing, Advanced RPM proves more valuable in game-time decisions.

Finally, if measured with respect to salary and market value, Advanced RPM can show which players are under and overperforming. This can help managers decide contract lengths as well as make signing decisions with more confidence.



## Notable Players

- Among all eligible Attackers:
- > Highest ARPM – Bernardo Silva: 0.453
  - > Lowest ARPM – Neal Maupay: -0.367
  - > Roberto Firmino (ARPM): 0.178
  - > Anthony Martial (ARPM): 0.203

## Among all eligible Defenders

- > Highest DRPM – Joe Gomez: 0.345
- > Lowest DRPM – Adam Smith: -0.345
- > Virgil Van Dijk (DRPM): 0.186
- > Davinson Sanchez (DRPM): 0.219

## Among all eligible Midfielders

- > Highest RPM – Kevin De Bruyne: 4.2
- > Lowest RPM – Harry Wilson: -0.532
- > Jack Grealish (RPM): -0.118
- > Adama Traore (RPM): 0.084

## Among all eligible U21 Players

- > Highest RPM for U21– Steven Bergwijn: 1.381
- > Lowest RPM for U21 – Chris Mepham: -0.541
- > Trent Alexander-Arnold – 0.241
- > Phil Foden – 0.501

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