

Using Linear Regression to Find Value Players for Major League Teams

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Computational Methods for Analytics

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Introduction

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- ▶ The Los Angeles Dodgers payroll for 2015 was over \$272 Million.
- ▶ The world of Sabermetrics has redefined how teams find value in players.

Important Stats to Know

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- ▶ Batting Average and On Base Percentage (OBP)
- ▶ wOBA, ISO, WAR, and wRC

Main Problem and Project Goals

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Project Goal

- ▶ Find the best players to select based on perceived "underperformance" in the 2015 season.

Deciding the most predictable stat

wOBA had the highest R^2 value of .595, while Average had the lowest value with .1839

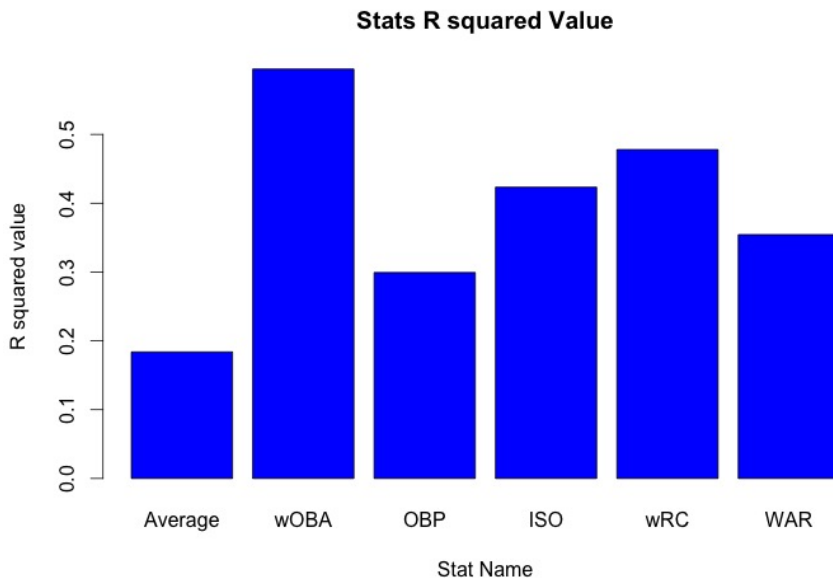


Figure 1: R squared value for each stat compared with RAPA.

What can wOBA tell us?

The value of wOBA

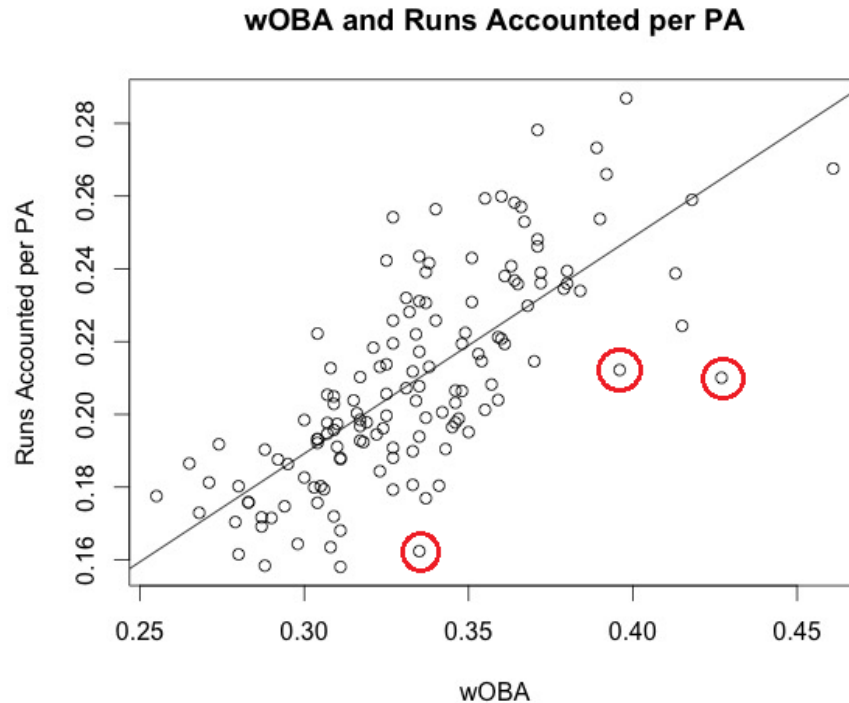


Figure 2: Finding Value with wOBA.

Value Players

Table 1: Stats

Player	AVG	wOBA	ISO	OBP	wRC	WAR	RA
Joey Votto	.314	.427	.228	.459	172	7.4	.210
Nelson Cruz	.302	.396	.264	.369	158	4.8	.212
Joc Pederson	.210	.335	.206	.346	115	2.8	.162

Value Player's Team

One reason for underperforming for 2015 was the entire team underperformed.

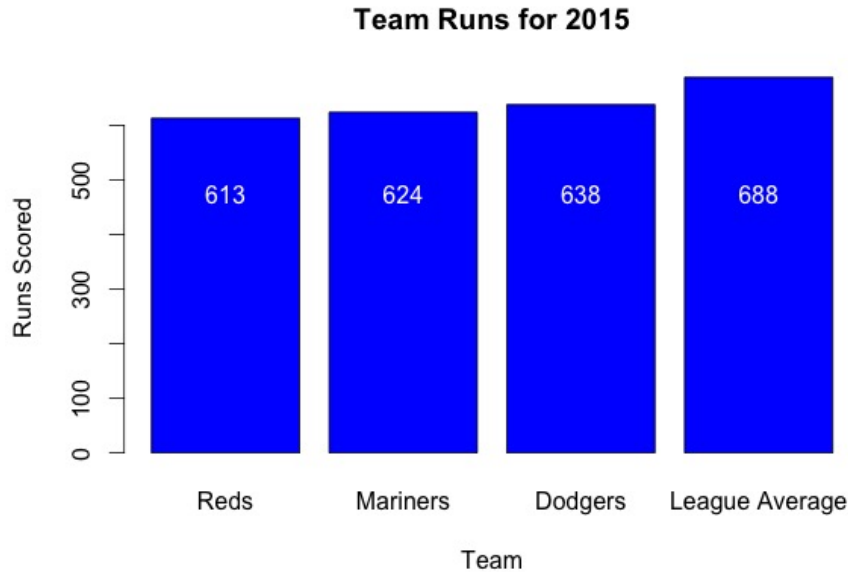


Figure 3: Team's Runs versus League Average

Finding the Best Model

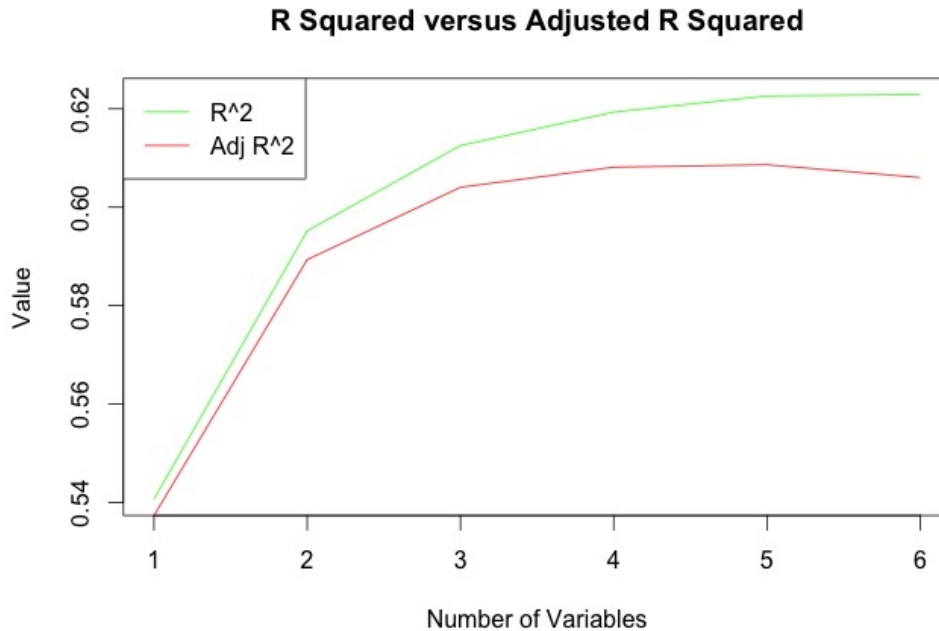
What other stats should be used for determining their worth?
Leaps and regsubfit()

Table 2: Summary of regsubfit()

Variables	wOBA	AVG	ISO	OBP	WAR	wRC
1	*					
2		*	*			
3	*			*		*
4	*			*	*	*
5	*	*		*	*	*
6	*	*	*	*	*	*

Selecting the best model

Using all six variables will continuously increase our R^2 value.



To avoid overfitting the data, I used adjusted R^2
Five variables gave the max adjusted R^2

Equation

$$\hat{y} = -.082 + (1.551)wOBA + (.095)AVG - (.425)OBP \\ + (.002)WAR - (.001)wRC$$

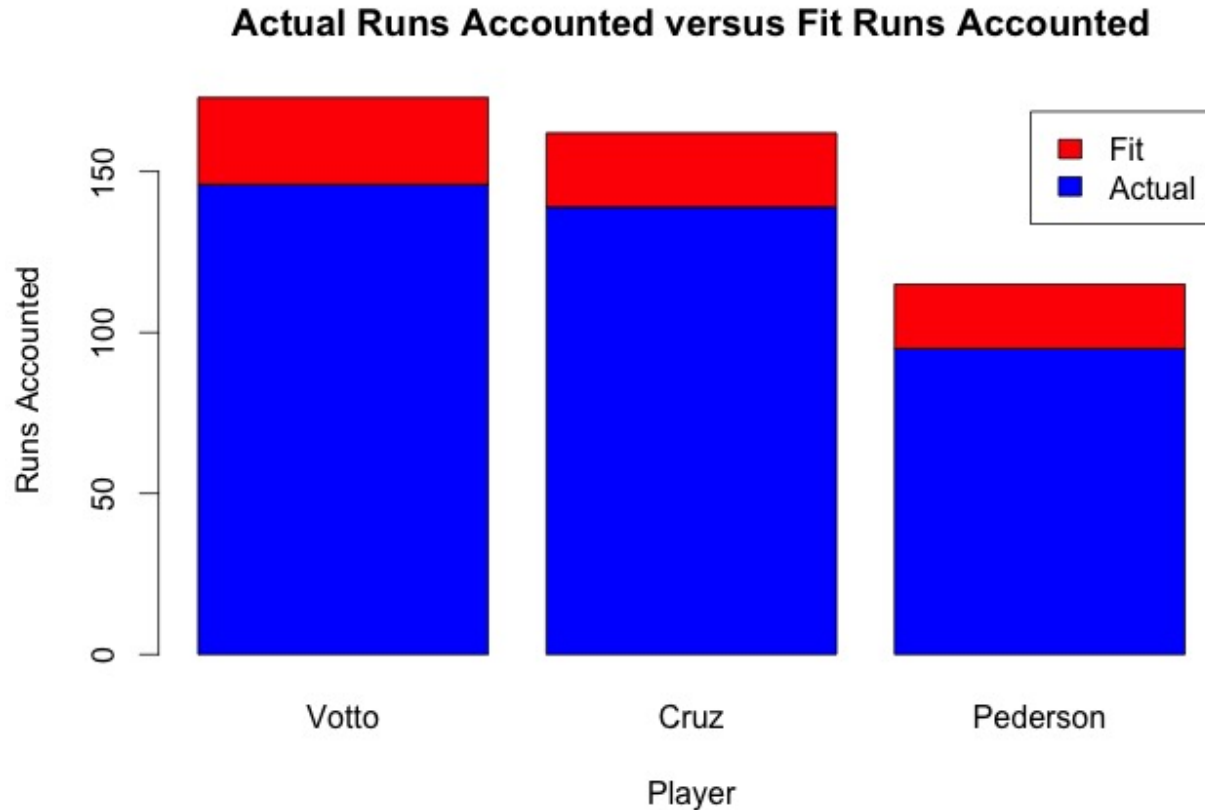
Fit, Confidence and Prediction

Using the model, the fit, confidence interval and prediction intervals were found.

Player	Actual	Fit	CI Lower	CI Upper	Prediction Lower	Prediction Upper
Joey Votto	.210	.249	.236	.261	.212	.286
Nelson Cruz	.212	.248	.239	.258	.212	.285
Joc Pederson	.162	.196	.184	.208	.159	.233

Using the Model

Player's Actual vs. Fit Runs Accounted for 2015



Taking Action

Nelson Cruz vs. Joey Votto

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At Joc Pederson's fit he would be equivalent to Melky Cabrera, who was paid \$8 Million.

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Pederson's fit value was .196, compared to Cabrera's actual of .198 and fit .192.

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Further Exploration

- ▶ Fielding

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- ▶ Age

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Further Exploration

- ▶ Fielding
- ▶ Age
- ▶ Positional Value
- ▶ Ball Park
- ▶ Finding over valued players



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Thank You