

Impact of Research on Univerisity Rankings

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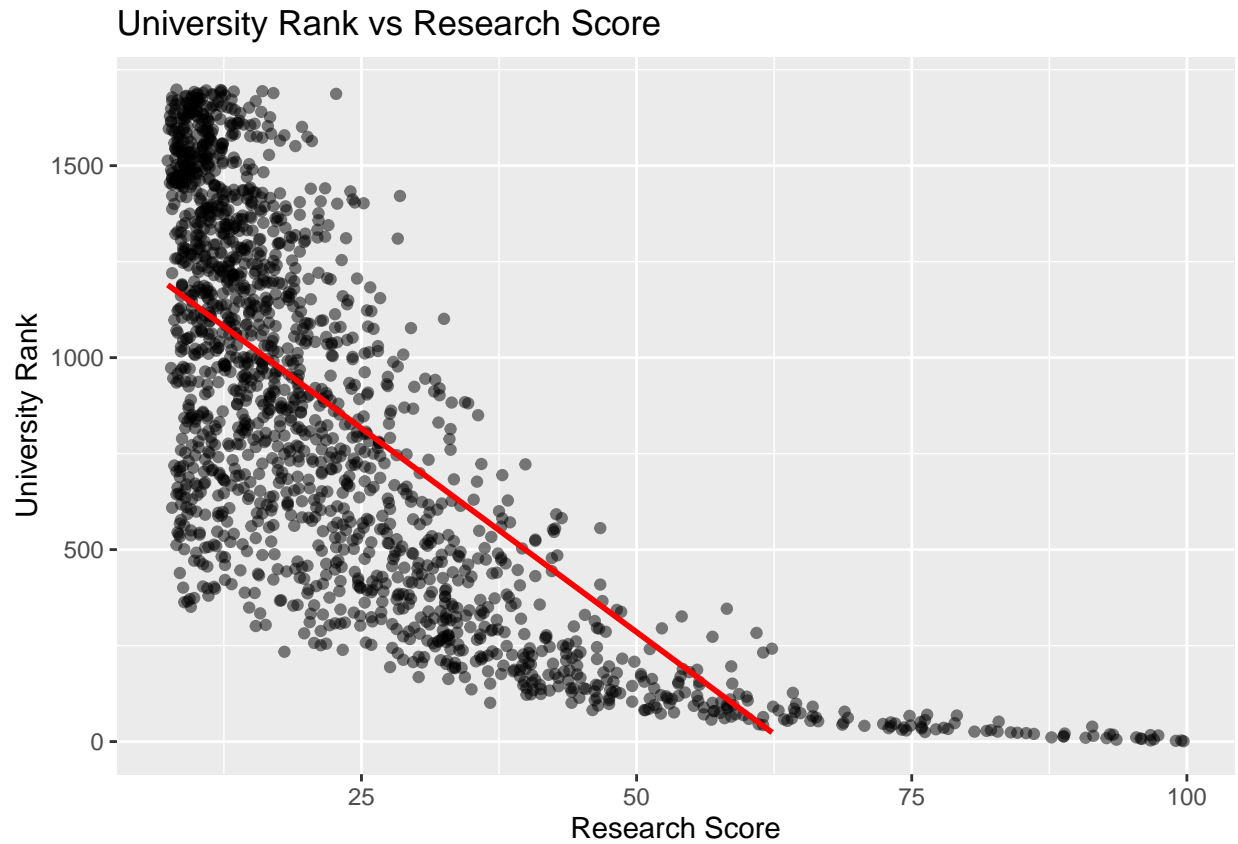
Introduction:

- Many schools either brand themselves as teaching, professional, or research focused universities.
- By measuring the trends of institutions across the globe we can determine if their ability to conduct meaningful research correlate to its statute.
- Goal: Does a university's research efforts have an effect on its global ranking?
- Response variable: Global ranking
- Explanatory variable: Research score (out of 100)
- Observations: 1695 universities

Analysis:

To better understand the relationship, a thorough statistical analysis was conducted.

Plot:



From the graph there appears to be a strong negative linear relationship between research score and university ranking, however this will be validated in later tests. We see that as research score increases, rank decreases(goes towards better rank).

More information can be observed from better understanding the linear model:

Model:

Call:

```
lm(formula = University.Rank ~ Research.Score, data = data)
```

Residuals:

Min	1Q	Median	3Q	Max
-794.7	-261.5	-14.9	269.9	822.3

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1346.6788	13.7041	98.27	<2e-16 ***
Research.Score	-21.2322	0.4738	-44.81	<2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 331.8 on 1695 degrees of freedom
Multiple R-squared: 0.5422, Adjusted R-squared: 0.542
F-statistic: 2008 on 1 and 1695 DF, p-value: < 2.2e-16

From this summary output we can note a few key details about the model.

- $\hat{Y} = 1346.679 + (-21.23218)*X$
- \hat{Y} is university ranking
- X is research score of university

Statistical Tests and Inference:

Hypothesis Testing:

- H0: There is no association between university ranking and research score
- H1: There is an association between university ranking and research score

The p-value was $2.2e^{-16}$ which is much lower than the significance level of 0.05. Therefore, we can reject the null hypothesis, indicating that there is a strong statistical evidence that when university ranking decreases or gets closer to rank 1, research score increases.

Correlation:

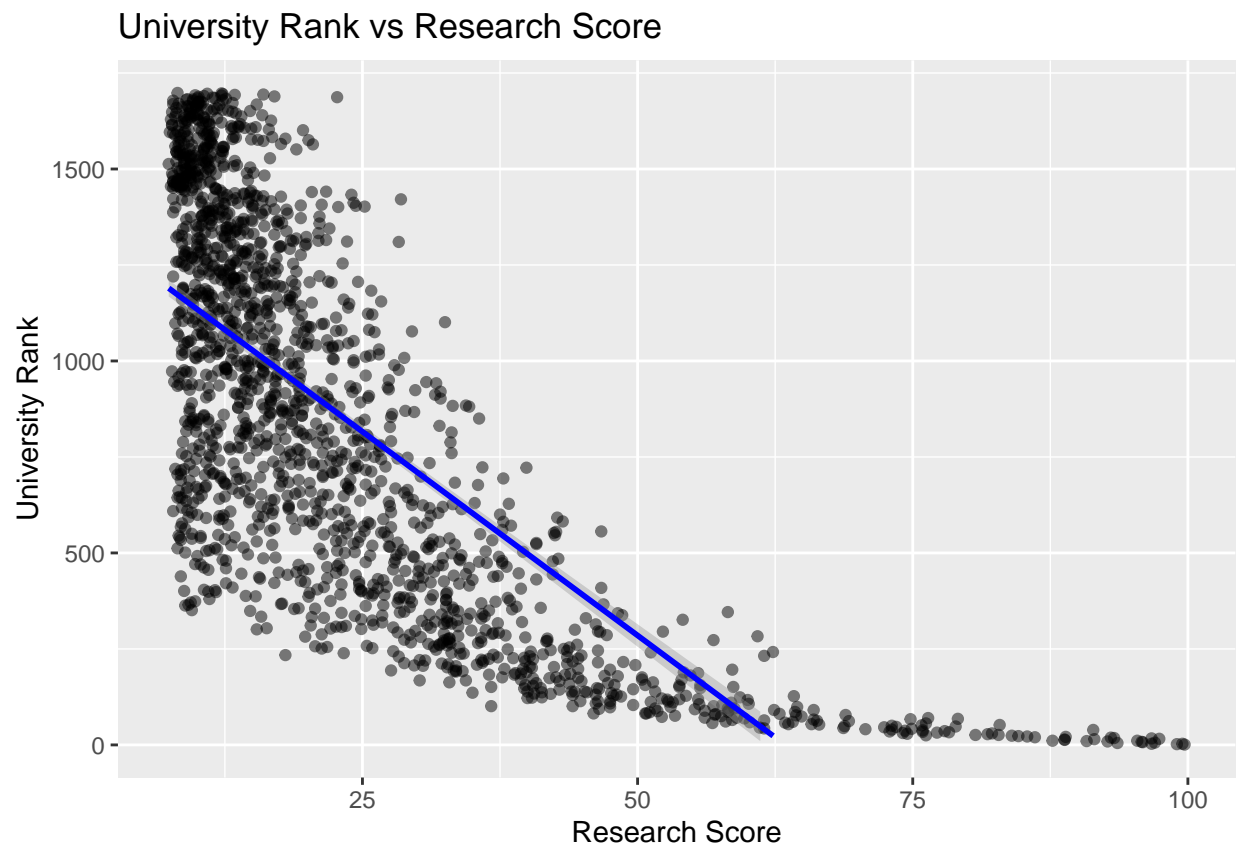
- The R^2 value indicates that 54.2% of the variation in university rank can be explained by the research score.
- The estimated residual standard error is $s = 331.8$ on 1695 degrees of freedom. This indicates that there is some variability in the models predictions.
- Correlation coefficient between University.Rank and Research.Score: -0.736. This indicates a strong negative correlation, as one variable increases the other decreases.

Confidence Intervals:

	2.5 %	97.5 %
(Intercept)	1319.80011	1373.5575
Research.Score	-22.16156	-20.3028

We are 95% confident that as the research score increases by 1%, the overall university rank decreases by 22.2 to 20.3 ranks.

Graphical representation of data with intervals:



Prediction:

Transformation and Comparison:

Assumptions:

Conclusions: