Impact of Research on University Rankings

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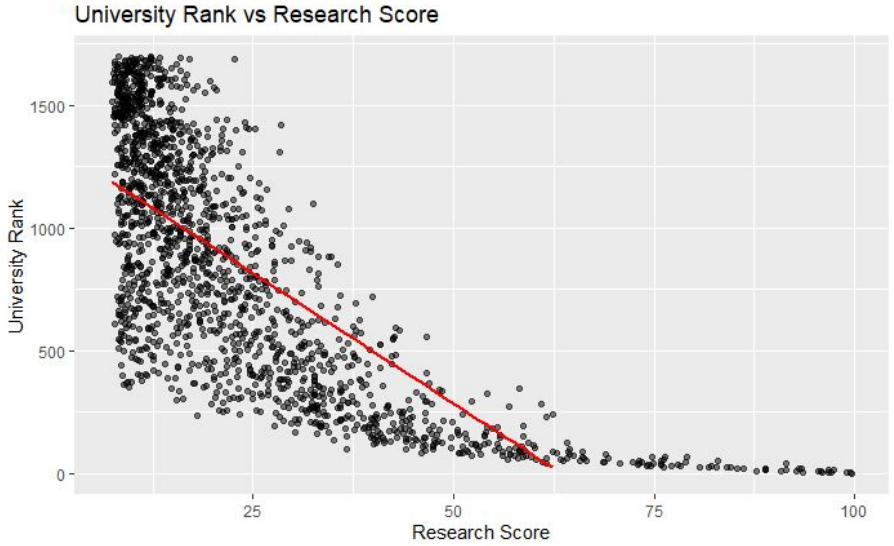
Introduction

- 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

Linear Model and Graph

- $\hat{Y} = 1346.679 + (-21.23218)*X$
- $\hat{Y}$ is university ranking
- X is research score of university
- As research score increases, rank decreases (goes towards better rank)



Hypothesis Test

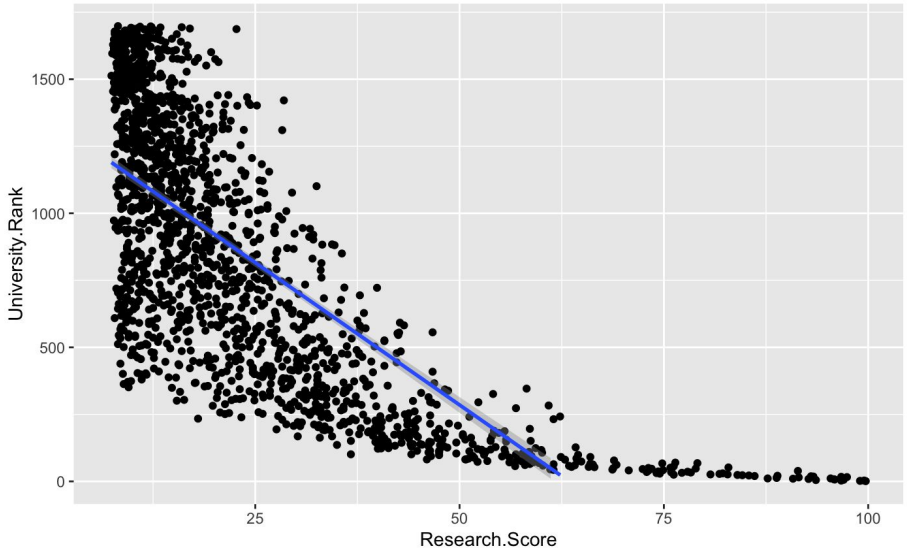
H_0: There is no association between university ranking and research score

H_1: 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.

Interpret Confidence Intervals

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

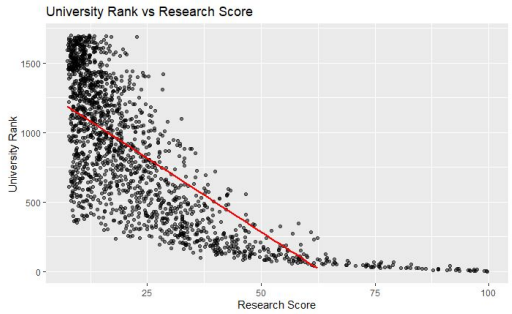


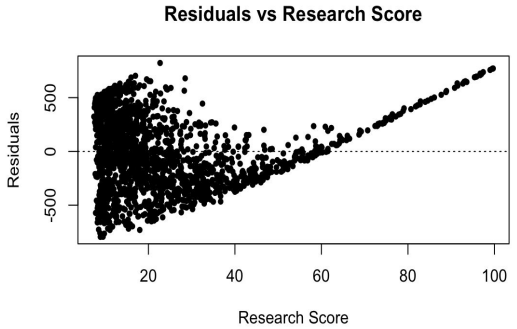
Correlation and Errors

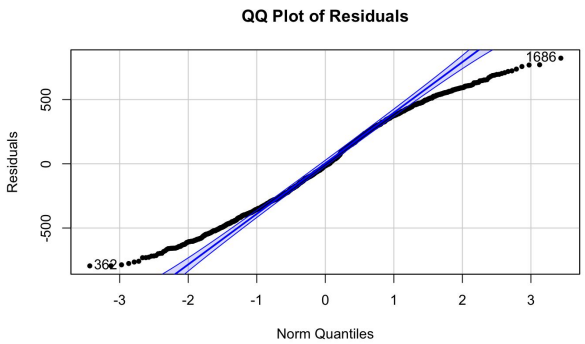
- Correlation coefficient between University.Rank and Research.Score: -0.736
- This indicates a strong negative correlation, as one variable increases the other decreases
- The coefficient of determination, R^2, is 0.542. Which means that 54.2% of the variation in university rank can be explained by 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.
- Overall, the model does a good job of estimating university rank from research score, however, R^2 and RSE indicate there are other factors that contribute.

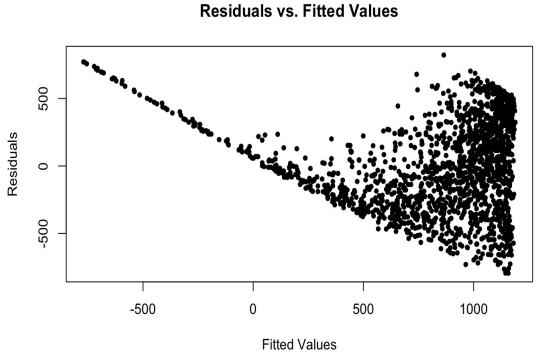
Assumptions

- $\hat{Y}$ = 1346.679 + (-21.23218)*X
- Normality: Not normal
- Linearity: Yes
- Constant Variance: No
- Independence: Yes
- Transformation needed









Predictions

- $\hat{Y}$ = 1346.679 + (-21.23218)*X
- For a university that has a research score of 60 we can predict its ranking.
- For a 95% confidence interval, we predict that a university with a research score of 60 will have a ranking between 725 and 1.