

Statistical Analysis Plan

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Population

- Local authorities in England.

Primary Objective

- To investigate and describe the characteristics of the local authorities with respect to their choice of political parties in the local elections.

Secondary Objectives

- To assess the significance of the 2016 EU referendum result on the outcome of the local elections.
- To investigate any association between social class and political party affiliation
- To assess the significance of change in party affiliation in each of the local authorities with respect to the 2017 general election result and the 2019 local election result.
- To assess the differences and significance of voter turn out between the 2019 local election and the last local elections.

Data Collection Methods

- Data from the 2016 EU referendum.
- Data on the 2019 local election result data.
- Data on the distribution of social grade.

Variables Under Consideration

- Change in number of seats for each political party in each local authority (discrete) – primary response variable.
- Number of seats won by each party in each local authority in 2019 (discrete).
- Total number of seats owned by each political party in each local authority (discrete).
- Proportion of population in each social grade for each local authority classed as AB, C1, C2 and DE (continuous) – primary covariate.
- Proportion of votes obtained by each party in each local authority in the 2017 general election (continuous) – primary covariate.

- Proportion of leave votes in the 2016 EU referendum for each local authority (continuous) – primary explanatory variable.

Missing Data Procedures

- As some local authorities did not have elections at all, we will only consider the local authorities that held elections on May 2nd, 2019 in our analysis. Other missing values will be replaced by the mean value of the feature in which they occur.

Numerical and Graphical Summaries

- Descriptive statistics of seats won and seats lost by political party.
- Boxplots and table of counts of overall wins and losses of each political party.
- Pairs plots of all continuous variables (social grades, proportion of votes obtained by each party in the 2017 general election, proportion of leave votes in the 2016 EU referendum).

Models To Be Fitted

- In all analysis, 5% level of significance will be used.
- Primary Objective

GLM (Poisson regression) of the form:

change in number of seats owned ~ social grade + proportion of leave votes + popularity in last general election [separately for each political party].

Assumption: equality of mean and variance in the response variable

Diagnostic Check: Pearson residuals to check for trend and assessing goodness of fit of the model

- Secondary Objective

GLM (Poisson regression) of the form:

change in number of seats owned ~ social grade + proportion of leave votes + popularity in last general election + social grade:proportion of leave votes + social grade : popularity in last general election + proportion of leave votes:popularity in last general election.

Assumption: equality of mean and variance in the response variable

Diagnostic Check: Pearson residuals to check for trend and assessing goodness of fit of the model and performing variable selection to drop less significant terms.