GE2019 Post Mortem

We take the per-constituency age distribution from the House of Commons data library [1]. This data shows the number of people and distribution of age in each constituency, enumerated and as a percentage, as well as national aggregates.

For each party, we order all constituencies by vote share (as a percentage) for the party, and choose the top n% of these as representatives of the party's electorate demographic. We plot the average age distribution over these constituencies, as compared to the UK average, with 1 standard deviation (Figure 1). We find that there were statistically significant deviations from the UK average in the representative demographics of Labour and Conservative voters. Labour voters were 2 standard deviations more likely to be 20-40 years old and 1 standard deviation less likely to be 50-80. Conservative voters were 1 standard deviation less likely to be 20-40 years old and approaching 1 standard deviation more likely to be 50-80. The Green and SNP demographics appear to follow Labour demographics for younger people, while the Liberal Democrats and BXP demographics appear to follow Conservative demographics in general.

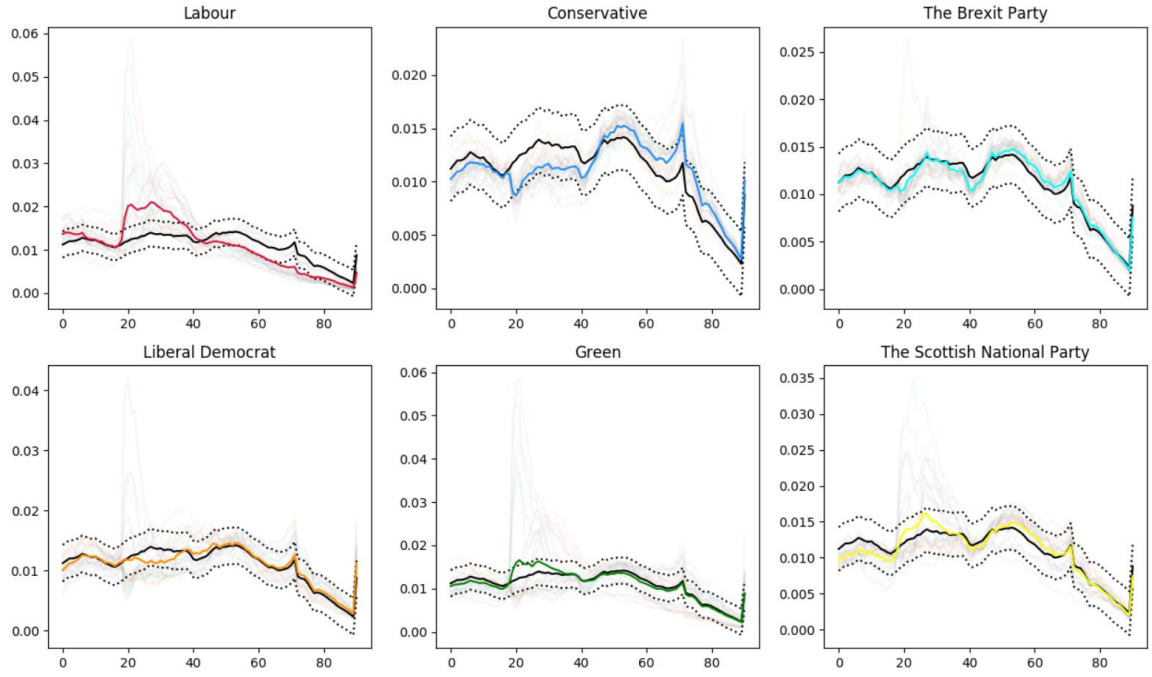

Figure 1: Age distribution of the representative demographics (i.e. most successful constituencies) of each party compared to the national average (black line). Faded in the background are the per-constituency age distributions.

We can see this another way by subtracting the UK average age distribution from the party representative demographics (Figure 2).

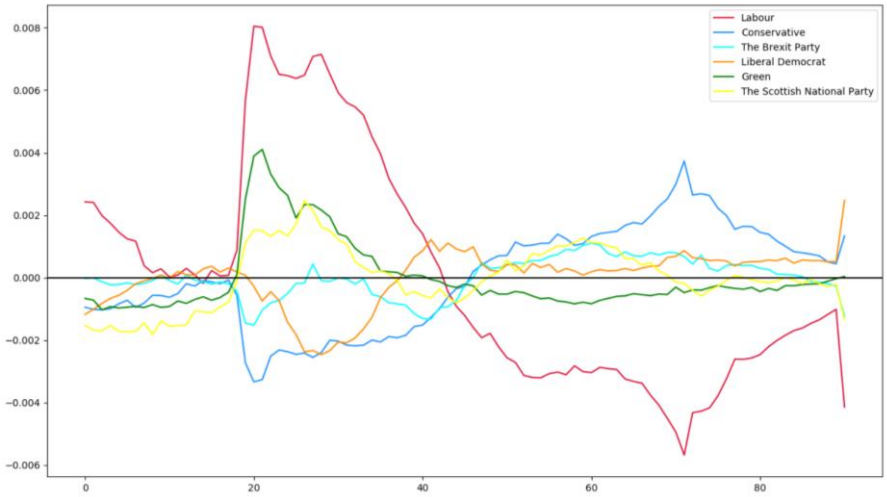

Figure 2: Age distributions of all parties representative demographics relative to the national average (black line)

We can also examine the age distributions independent of votes to find that youth vote is far more concentrated than older vote. In fact, the 20-25 electorate is 6x more concentrated than the national average and the 25-40 electorate is ~2x more concentrated (Figure 3)

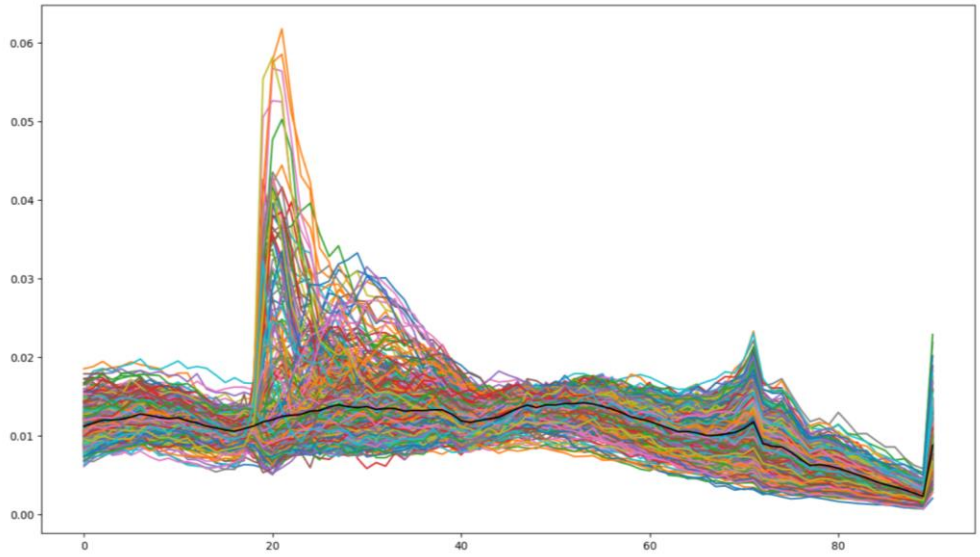

Figure 3: The age distributions of all 650 constituencies plotted on the same axes. The younger electorate is far more concentrated into the same constituencies compared to the national average.

We can find the constituencies with the most imbalanced demographics by examining the entropy of the age distributions. The entropy of a distribution measures the "difficulty" in encoding its underlying information; the lowest entropy distribution would be a single peak on an infinitely small section of the domain, the highest entropy distribution would be a flat uniform distribution. We find that the constituencies with the lowest entropy are almost exclusively in major cities, such as Sheffield Central, Manchester Central, Liverpool (Riverside), Bristol West, Cardiff Central, Leeds Central, Glasgow Central etc. The constituencies with the highest entropy are almost exclusively in the rest of the country e.g. Lewes, New Forest East, Myre and Preston North, Wirral West, Gosport, Cheadle etc. Therefore, young adults appear to live almost exclusively in cities and in statistically significant amounts, whereas older adults live across the country in uniform distribution.

If young adults are far more likely to vote Labour, and also far more likely to live in the same cities, then under the spatially-based democratic model and FPTP, their votes count for less than their older

peers; a form of passive gerrymandering. We can examine the distributions of the vote shares (as a percentage) for each party in all constituencies they participated in (Figure 4). We find that the vote share distribution for Labour is weakly bi-modal and that the second peak has a negative skew, i.e. either Labour would obtain around ~20% of the vote share in a constituency or ~40%, with some constituencies voting overwhelmingly for Labour. This distribution correlates with our earlier analysis. If young adults are more likely to vote labour, and the young electorate is more concentrated, then young votes create the second peak, while the older voters spread across the UK create the slightly sharper first peak. The cities create the negative skew tail.

In contrast, Conservative vote share was unimodal with a positive skew and a sharp drop off at 65%+.

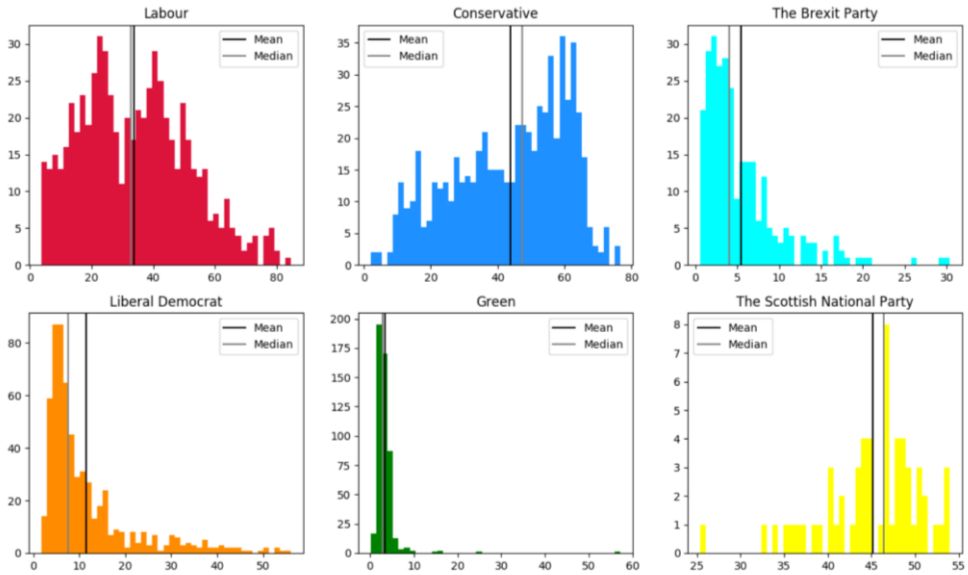

Figure 4: Vote share (percentage) distribution across all constituencies for all parties.

References

[1] https://commonslibrary.parliament.uk/local-data/constituency-statistics-population-by-age/ [Accessed 2019/12/13]