User Guide to Shiny App for Ecological Inference of Racially Polarized Voting

This user guide will walk you through using the Ecological Inference App to estimate the level of racial vote polarization in a particular election. Before you start, you will need to choose an election between two candidates to analyze. In order to demonstrate racially polarized voting, you will need to examine a number of elections in this manner.

Finding and Formatting Inputs

1. First, create a new spreadsheet. Each row in the spreadsheet will correspond to an individual precinct, and each column will specify pieces of information to input about the precinct. The columns of your spreadsheet should be labeled with the following headers: precinct_ID, precinct_vote_total, percent_[candidate1], percent_[candidate2], percent_[minority]_voters.
2. Next, you will need to find the data to populate the sheet. The first column, precinct_ID, should list a unique identifier for each precinct. You should be able to find a list, depending on the race, through the office of your secretary of state or county clerk. Some offices make this information available online, while others may require phone calls or written requests. You will also need to look up or request a shapefile of precincts (a digitized map showing their boundaries) to complete step 4.
3. The next three columns—precinct_vote_total, percent_[candidate1], and percent_[candidate2]—require election results by precinct. precinct_vote_total should contain the total number of ballots cast at each individual precinct for the election you are examining. (Note that turnout for the precinct as a whole may be higher than turnout for a particular race. For instance, some voters who cast ballots for the state legislature may not specify any choice for the school board election.) percent_[candidate1] and percent_[candidate2] will either be specified in the data you are given, or can be calculated by dividing each candidate's votes at a precinct by the total votes cast for that race at that precinct. Note that whenever a column reports percents, use decimals ranging from zero to one to report percentages.
4. The final column, percent_[minority]_voters, is an estimate of the demographics of each precinct. Although the Census collects detailed information about race by location, that information does not generally map cleanly onto voting precincts. Census data is available in shapefiles at https://www.census.gov/geo/maps-data/data/tiger-data.html. You will need to use a mapping application such as QGIS to load this data and overlay the precinct shapefiles.
    a. You will need to use the mapping application's tools to calculate racial makeup of each precinct. Some census tracts will have area in more than one precinct. In those cases, you can use the mapping application to calculate the area of the precinct, and allocate its population proportionally to the precincts with which it overlaps.

    b. Precincts and census tracts have different total populations. Because your final output should be the percent [minority] population of each precinct, you will need to calculate the precinct's minority population and divide by the precinct's total population.
    c. Note that census data includes all residents of a particular area, even those who are too young to vote, noncitizens, or unregistered. Experts often use additional regressions to adjust their estimates of minority voters at each precinct.
5. Save or export your spreadsheet as a .csv (Comma Separated Value) file so it can be uploaded to the Shiny App.

Using the App

1. On the Shiny App, upload the CSV file by clicking "Browse…" and finding the file. The drop-down menus should now load with your column names as options to select.
2. Under "Candidate 1 data," select "percent_[candidate1]."
3. Under "Name of candidate 1," write that candidate's name.
4. Under "Candidate 2 data," select "percent_[candidate2]."
5. Under "Name of candidate 2," write that candidate's name.
6. Under "Racial demographic variable," select "percent_[minority]_voters."
7. Under "Name of minority race," write the name of the race you are considering.
8. Under "Total votes cast," select "precinct_vote_total."
9. For the "Homogeneous precincts threshold," adjust the slider to the percentage of precincts you want to designate as extreme for purposes of the calculation. This setting exists because the most homogenous precincts are most useful for inferring racial vote polarization. You can begin by using 5% as a default value.
10. Click "Run." You can consult the expert report template for further information on the analysis and guidance on its presentation.

Notes on Data Entry and Formatting

1. The process of manually entering data points can be tedious, and if you are not careful, lead to mistakes. Check over your input multiple times to make sure the correct numbers align with their respective columns and precincts.
2. You can run multiple analyses from the same CSV by creating additional columns. You might want to do this if you are looking for polarization of more than one group against the rest of voters. You will have to run these calculations one group at a time (for instance, by testing first the polarization of Asian versus non-Asian voters, and then the polarization of Hispanic versus non-Hispanic voters.