Analysing Australian Election Results

How demographic factors influence primary voting

Carlos Yanez Santibanez

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Acknowledgement of Country

Introduction

Australia is a parliamentary democracy, with a *Westminster-style* system of government.

The House of Representatives is made up of one MP for each **Commonwealth Electoral Division**.
MPs are elected using a **preferential voting system**. Voting is compulsory for all 18+ Australian citizens.

Historically a *bipartisan system*, recent elections have brought in new political actors, seemingly challenging pre-conceptions about political persuasions.

Photo by Andy Wang on Unsplash

Questions

This project attempts to study how population make-up may influence how Australian citizens may vote for a particular party.
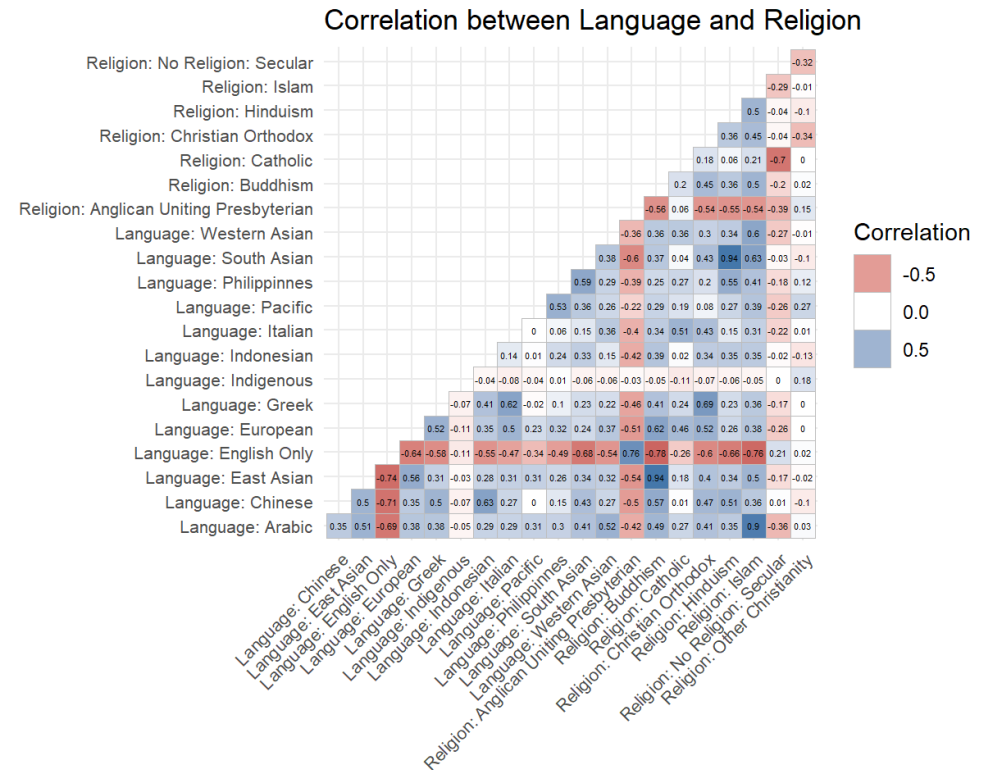
- Are there distinguishable demographic division lines?

- What are the main demographic factors influencing **primary voting** in federal elections? Do they differ in across electorates?

- Is it possible to use a demographic-based model to understand changes in the 2022 election? Can this model be contrasted against prevalent narratives such as:

  - was the so-called "Teal Wave" supported by discontent moderate Liberal voters?
  - are Millennials not becoming more conservative as they age?
  - is culturally diverse voting relevant?

Approach (summarised)

1. Obtained data from Census and Election Results (and matched occurrences).

2. Conducted initial selection of potential demographic covariates.

3. Clustered similar electorates, then trained a classification model.

4. Trained explainable model (**Primary Voting = f(covariates)**), as analysis tools.

5. *Naively* attempted to forecast the 2022 election, to assess the usefulness of model.
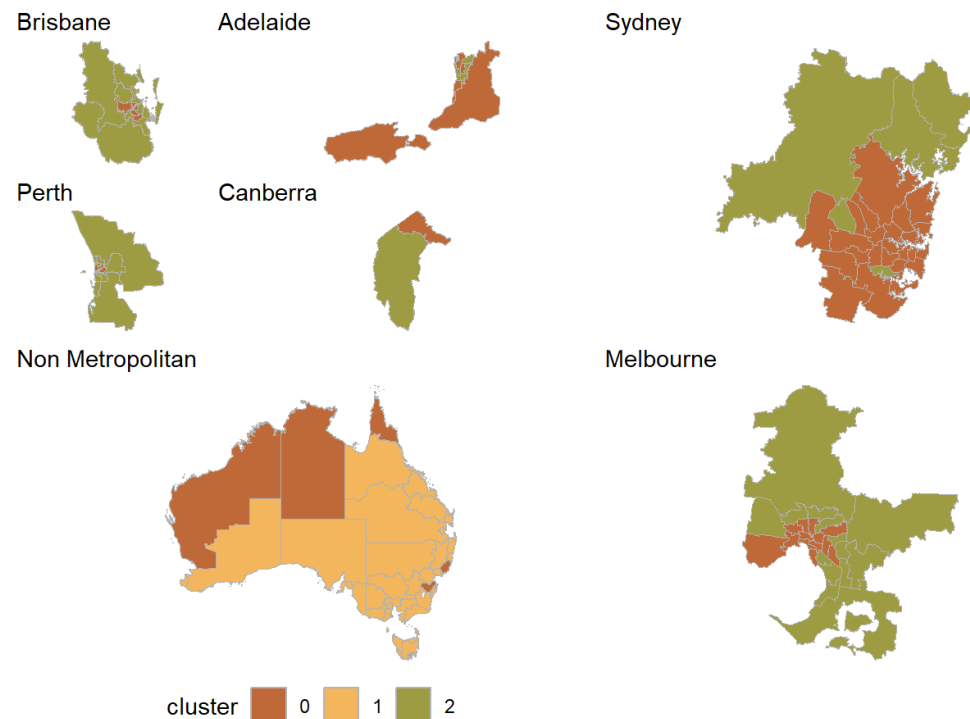
Data Selection

- Data extracted through **custom-made packages** ({auscensus}, {auspol} and {aussiemaps}).

- Primary voting data consolidated into **3 groups/parties** of interest (The Coalition, Australian Labor Party, Australian Greens), plus others.

- Demographic covariates inspected and chosen **55 variables from 9 Groups** (*Income, Education Levels, Age, Relationship Status, Household types, Household tenure, Citizenship, Religion, Language*), plus metropolitan/non-metropolitan flag.

- Covariates showing varying degrees of collinearity.

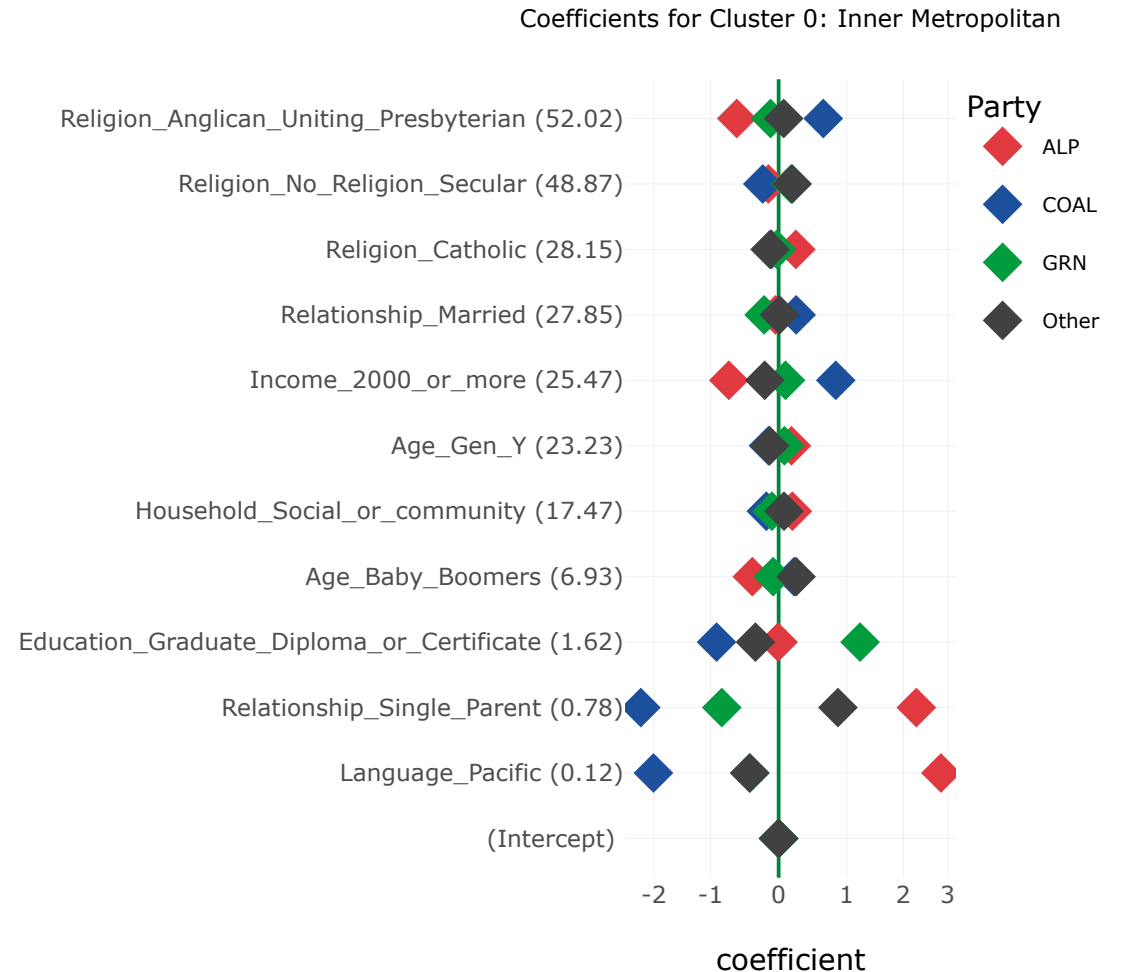Correlation between Language and Religion

Clustering

- Used **HDBSCAN**, which determines the number of clusters.

- Identified 3 clusters, matching narrative of **inner city**, **suburbia** and **regional areas**.

- Used **random forests** for classification of new electorates.

- Key factors in cluster selection : **metropolitan location**, percentage of **flats**, **Chinese speakers**, **monolingual speakers (English)**, **mortgaged households**.
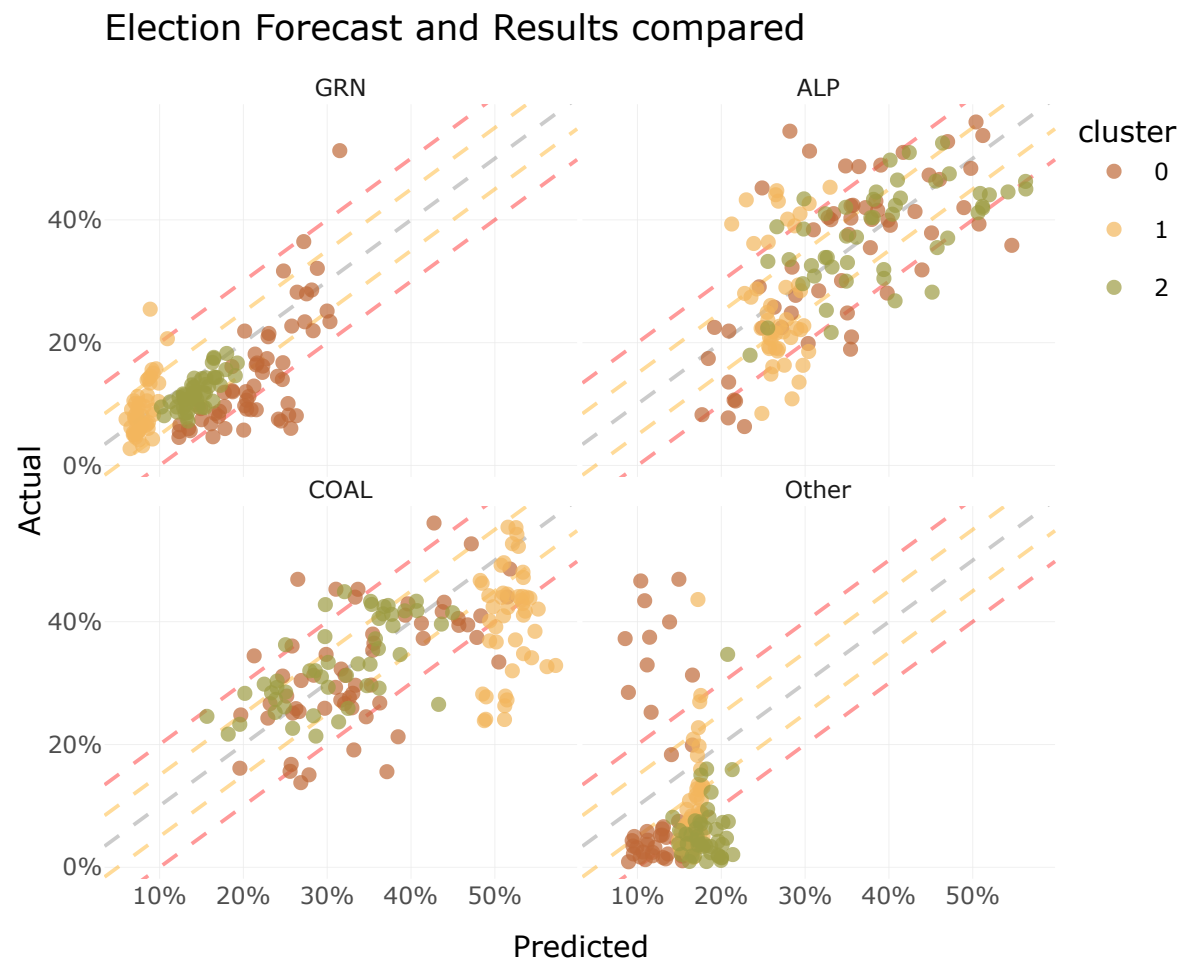

Clustering of 2016 Electoral Divisions

Brisbane   Adelaide   Sydney

Perth   Canberra

Non Metropolitan   Melbourne

cluster 0 1 2

Regression Model

- Multivariate regression model - $Y = \beta X$. Y represents the difference from mean primary voting. X difference against average values.

- Lasso regression to reduce the number of variables for each cluster.

- One elastic net regression for each cluster.

- Distinct clusters, produced distinct results:

  - In inner-city electorates, **religiosity**, **age**, and **income** are the most relevant factors.
  - In suburban electorates, there are similar dynamics, plus **household tenure**.
  - In regional and rural electorates, **higher incomes** tend to prefer **Labor** vote.

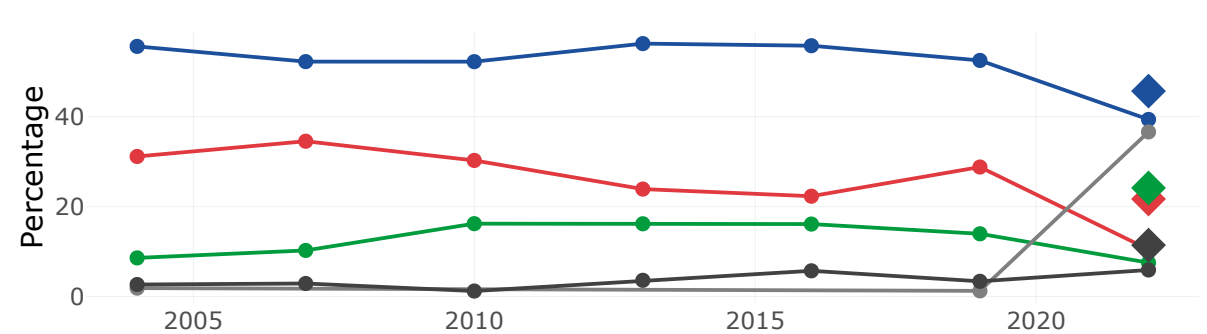Coefficients for Cluster 0: Inner Metropolitan

2022 Election

- A naive attempt to retroactively forecast the 2022 election was attempted.

- Forecast using the last Newspoll results prior to the election.

- Modest accuracy was obtained, however, the model proved valuable as an analysis tool.

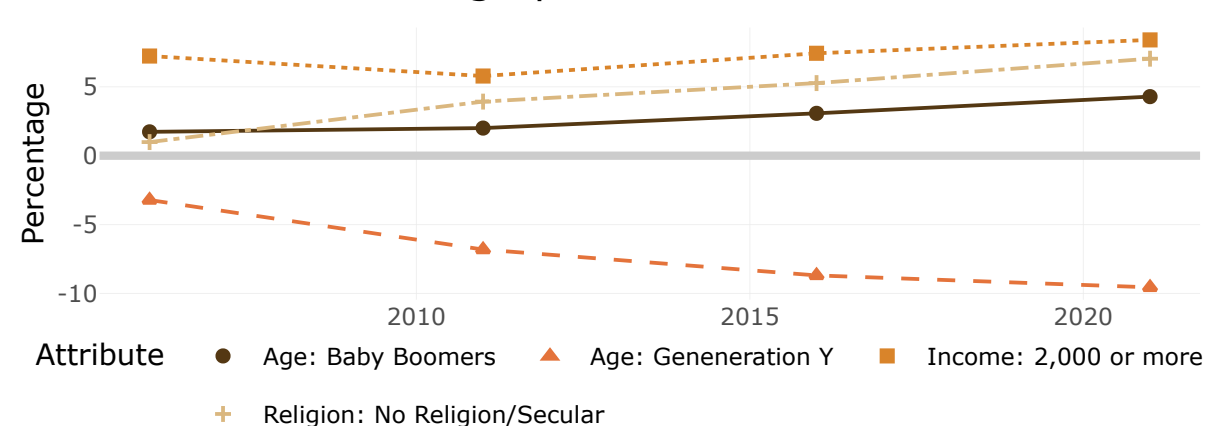Election Forecast and Results compared

2022 Election - The Teal Wave

- Centrist independents running on a platform of centre-right economics, plus environmental policies (i.e. blue + green).

- Teal candidates successfully unseated moderate Liberal incumbents across several *safe seats*.

- Perceived shift of *dissatisfied Liberal* does not correspond with modelling - Teals were likely elected on Green and Labor vote.
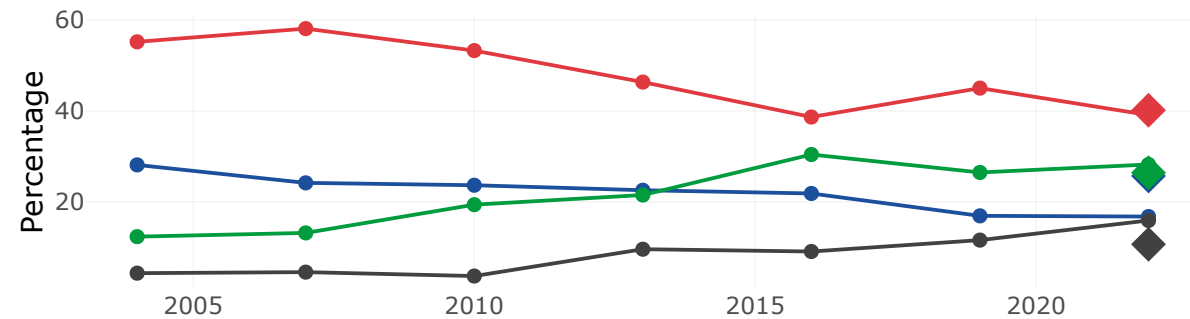

Election Results - Goldstein

Selected Demographic Attributes - Goldstein

Attribute ● Age: Baby Boomers ▲ Age: Geneneration Y ■ Income: 2,000 or more
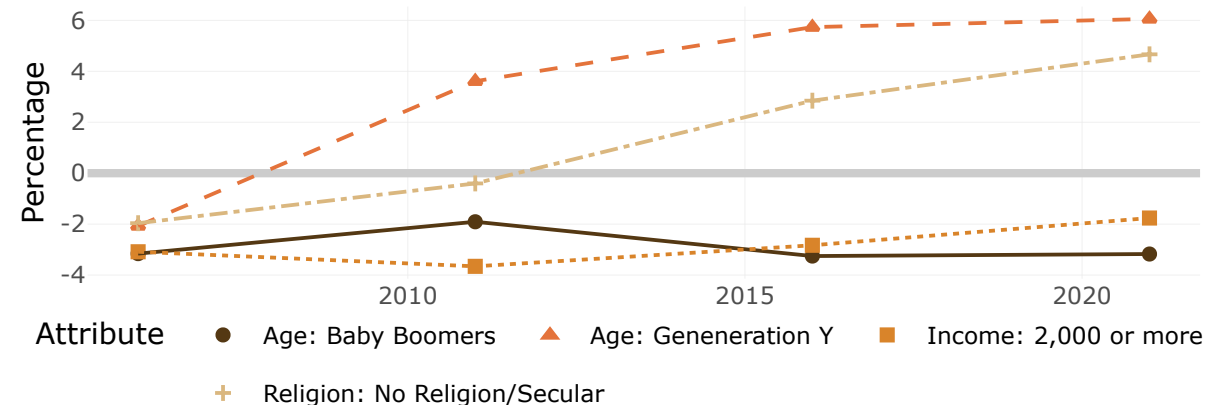+ Religion: No Religion/Secular

2022 Election - Green Electorates

- Greens increased their representation from 1 to 4 MPs.

- Greens primary voting higher in inner cities, driven by a combination of higher income, age (Millenials) and irreligiosity.

- In these areas, Green voting has grown alongside the Millennial population.
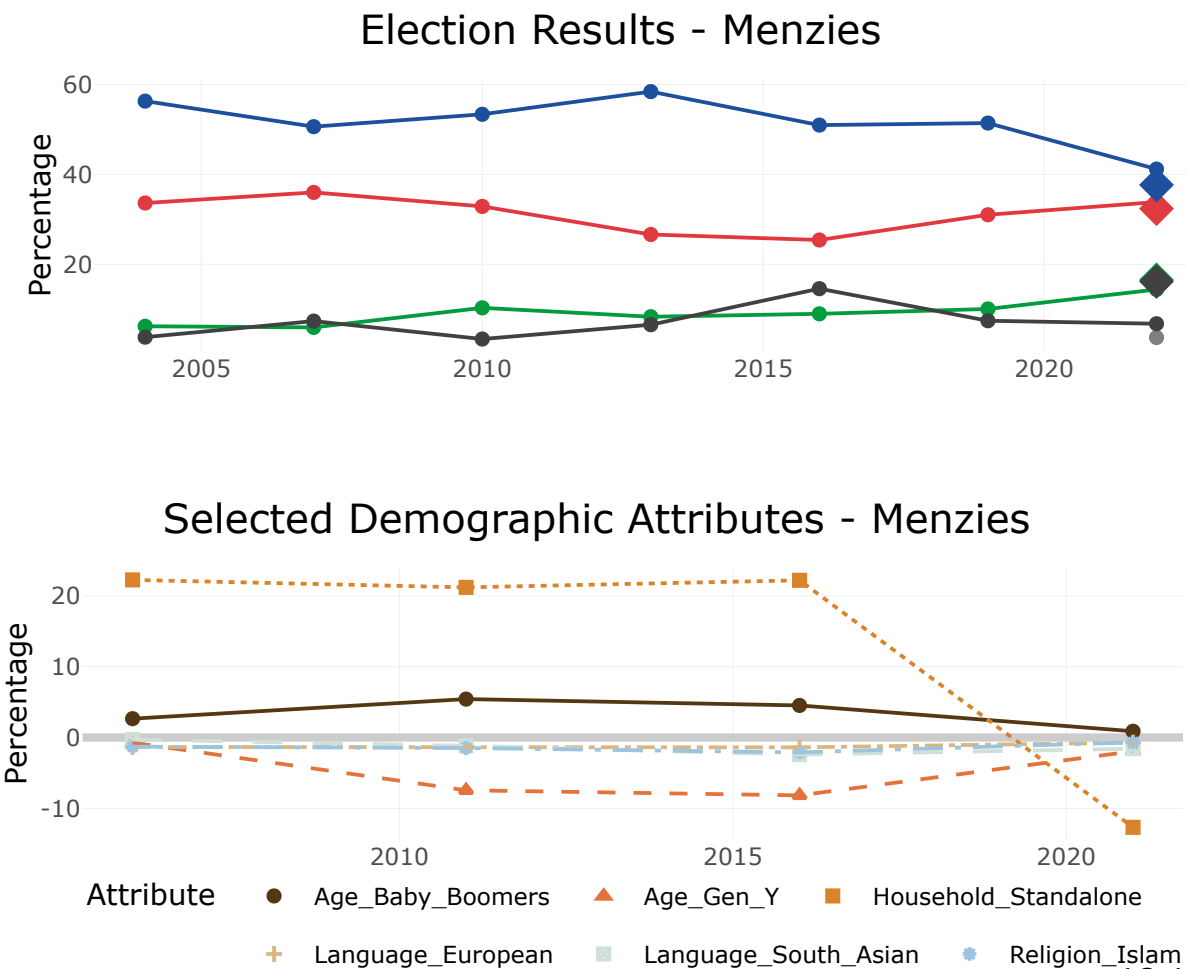

Election Results - Wills

Selected Demographic Attributes - Wills

Attribute   ● Age: Baby Boomers   ▲ Age: Geneneration Y   ■ Income: 2,000 or more
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2022 Election - City Fringe

- Outer suburban electorates can be diverse.

- Residential growth and densification can alter results, in addition to generational renewal.

Election Results - Menzies

Selected Demographic Attributes - Menzies

Attribute: ● Age_Baby_Boomers ▲ Age_Gen_Y ■ Household_Standalone + Language_European ▪ Language_South_Asian ● Religion_Islam
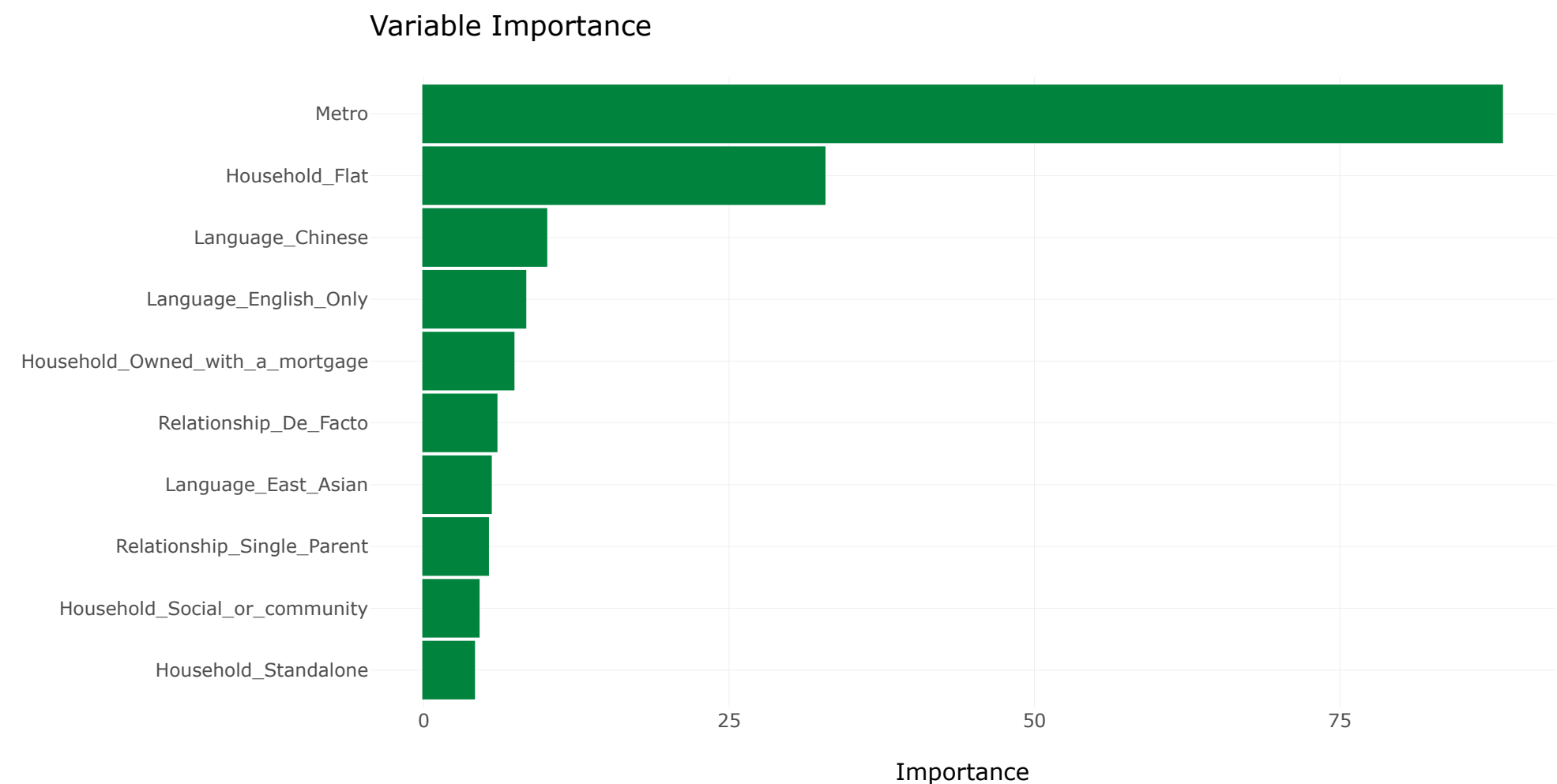
Conclusion

- Although not effective in forecasting elections, the model serves its purpose of identifying key factors driving the election.

- Areas to improve include:

  - Refine the segmentation model.
  - Include longitudinal aspect, to account for electorates' history and incumbent.
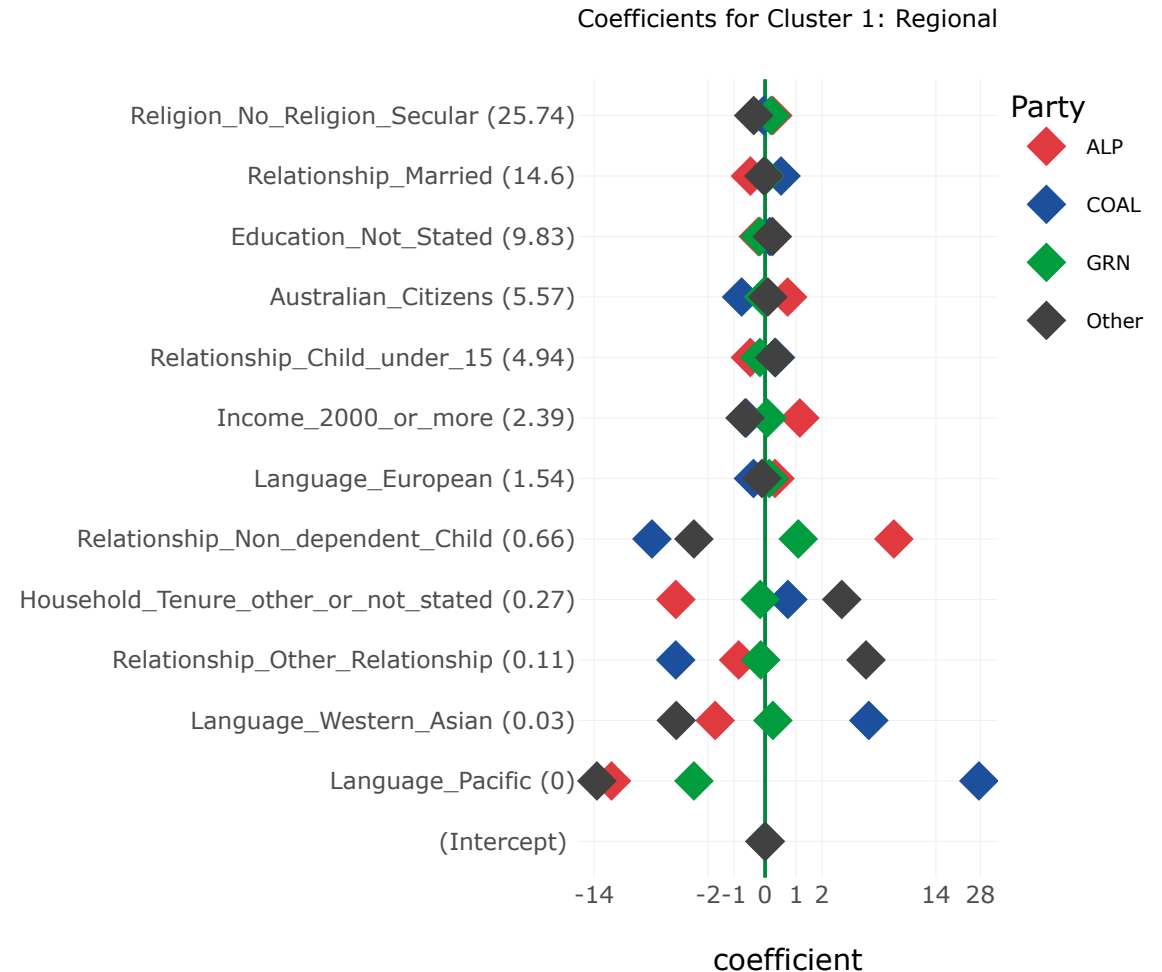 - Improve regression model.

Thanks

Additional slides

Random forests Importance plot
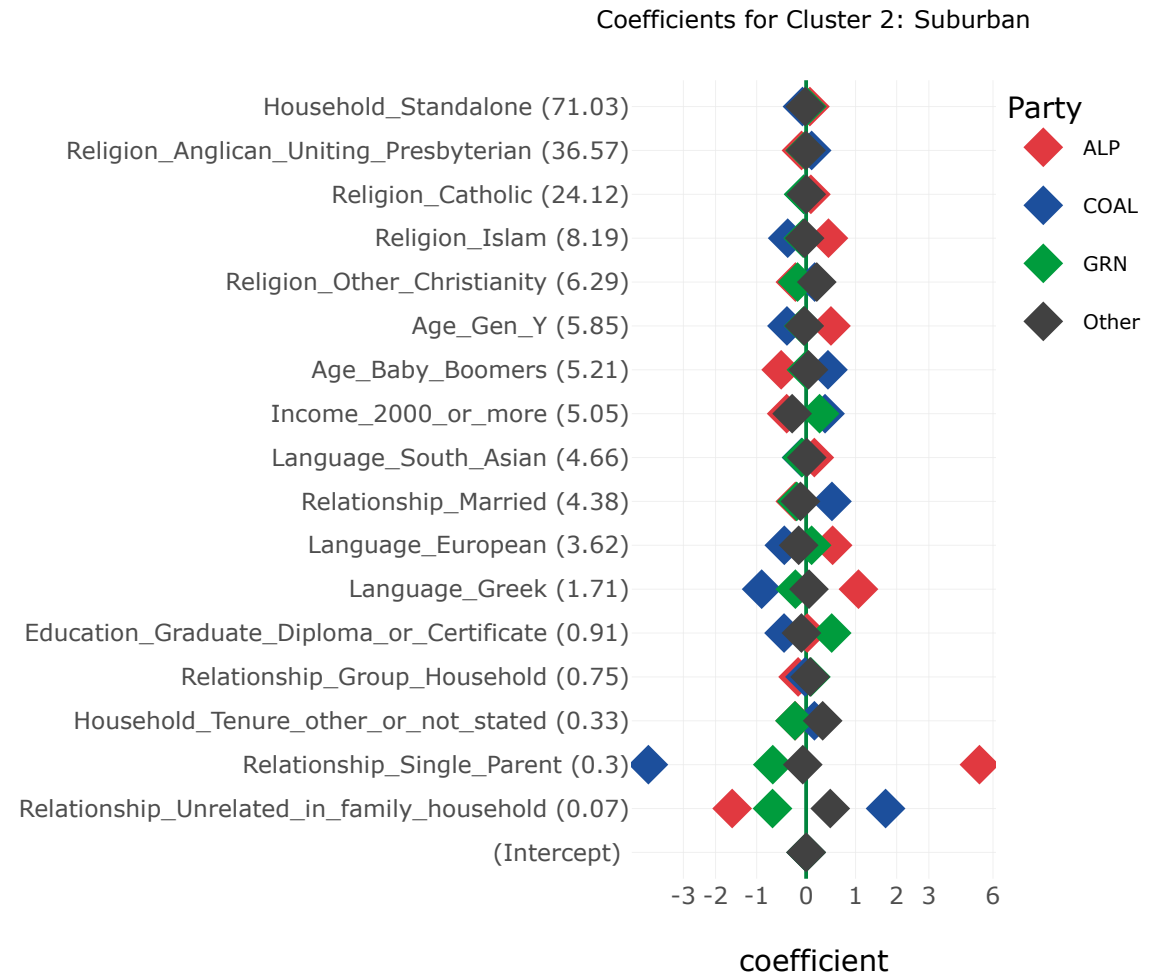

Variable Importance

Regression Model

- Multivariate regression model - $Y = \beta X$. Y represents the difference from mean primary voting. X difference against average values.

- Lasso Regression to reduce the number of variables for each cluster.

- Elastic net fitted, independently for each cluster

- Distinct clusters, produced distinct results:

  - In inner-city electorates, religiosity (or lack of it) and income are the most relevant factors.
  - In suburban electorates, there are similar dynamics, plus household tenure.
  - In regional and rural electorates, higher incomes tend to prefer Labor vote.

Coefficients for Cluster 1: Regional

Party: ALP (red), COAL (blue), GRN (green), Other (black)

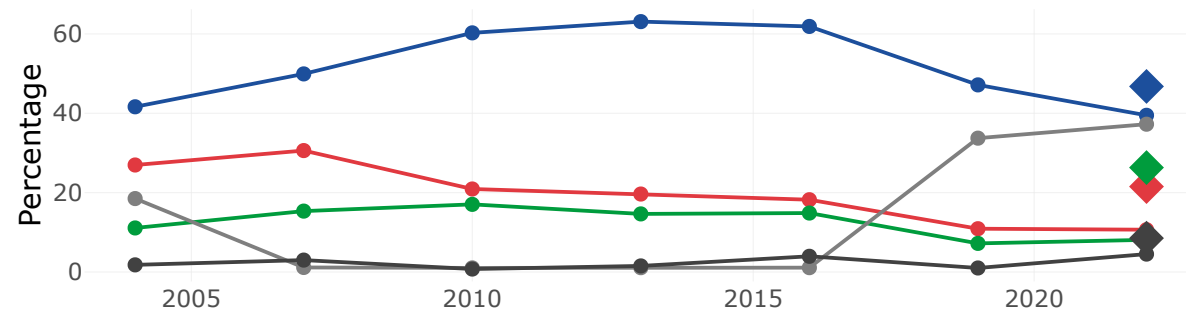coefficient

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Coefficients for Cluster 2: Suburban

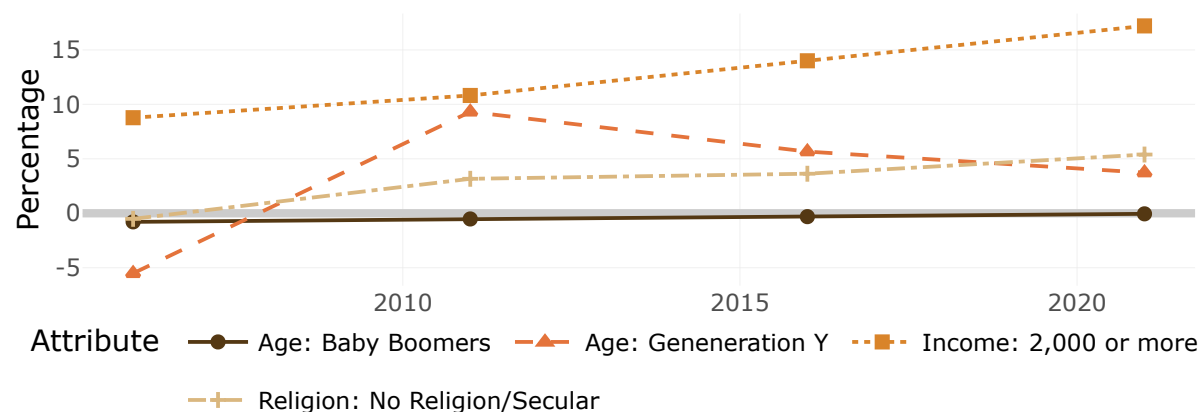Party: ALP, COAL, GRN, Other

coefficient

2022 Election - Teal Wave

- 2022 election saw centrist independents, running on a platform of centre-right economics, but green-focused policies (blue + green).

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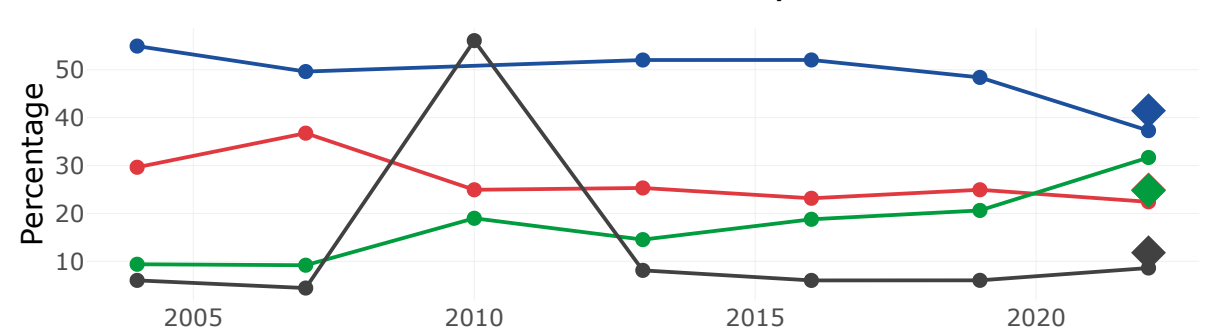
Election Results - Wentworth

Selected Demographic Attributes - Wentworth

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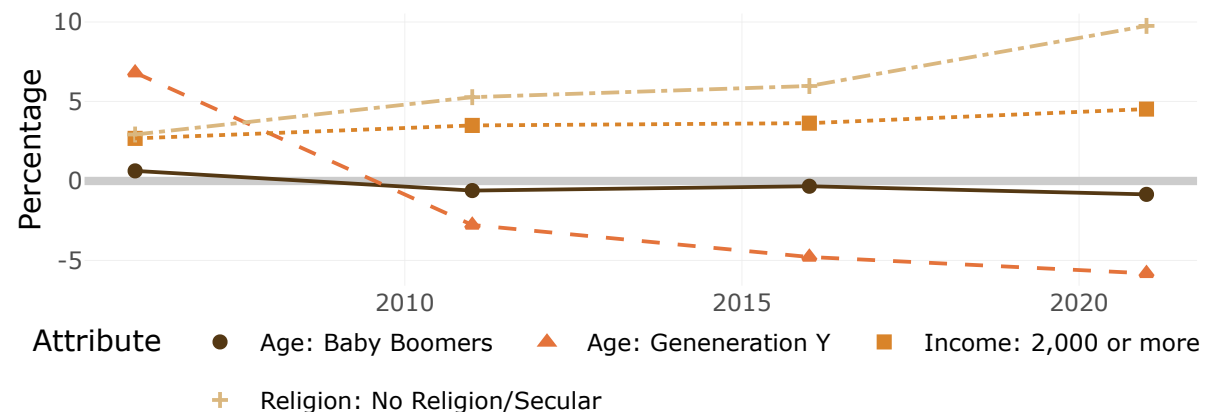
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- In these areas, Green voting has grown alongside the Millennial population.

Election Results - Ryan

Selected Demographic Attributes - Ryan

Attribute   ● Age: Baby Boomers   ▲ Age: Geneneration Y   ■ Income: 2,000 or more
             + Religion: No Religion/Secular

2022 Election - Newcastle

- The model does not reflect primary voting in Newcastle.

Election Results - Newcastle

Selected Demographic Attributes - Newcastle