Supplementary Materials for "Māori in New Zealand: Voting with their Feet?"

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1 How Electorates are created

The Representation Commission is the body in charge of deciding all changes regarding districts, their name, boundaries and location. Both the tightness of the electoral laws and traditional practices have made the Commission historically free of any suspicion of electoral malpractices such as gerrymandering.

Population size is very clearly delimited by the law: electorate populations cannot deviate more than $\pm 5\%$ from a given electoral quota. As a result, malapportionment is too out of the question, making all votes have virtually the same impact, regardless of whether they are cast in rural or urban districts.

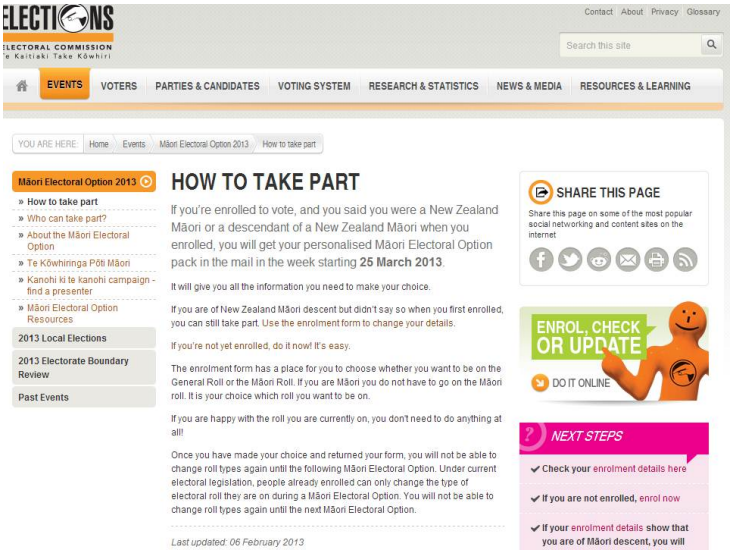
The number of South Island General electorates is fixed at 16 by the Electoral Act 1993. To calculate the number of electorates, the Government Statistician (i) divides the South Island General electoral population by 16 (this result provides the average electoral population for South Island electorates and is referred to as the South Island quota); (ii) divides the Māori electoral population by the South Island quota to work out the number of Māori electorates; and (iii) divides the North Island General electoral population by the South Island quota to work out the number of General electorates for the North Island. The number of Māori and North Island General electorates are rounded to the nearest whole number. For instance, in 2007, the electoral quota was $57,243 \pm 2,862$ for each North Island General electorate, $57,562 \pm 2,878$ for each South Island General electorate, and $59,583 \pm 2,979$ for each Māori electorate.

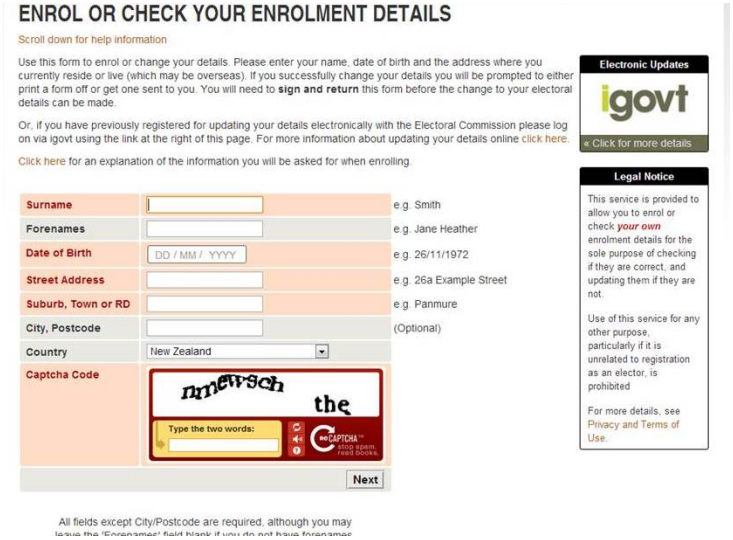
More details are available at the 2007 and 2014 Representation Commission Reports, available at `https://www.elections.org.nz/sites/default/files/2007%20Representation%20Commission%20Report.pdf` and `https://www.elections.org.nz/sites/default/files/bulk-upload/documents/report_of_the_representation_commission_2014.pdf`. See also `https://www.elections.org.nz/voting-system/electorates/how-electorates-are-calculated`.

2 Māori Electoral Option: details

This Appendix shows some screenshots taken from the Electoral Commission webpage during the Māori Electoral Options of 2013 and 2018. Basically, other than the procedures described above, these show that for non-registered Māori, Māori who moved, or Māori who did not receive the letter to participate at the Māori Electoral Option at home, the process is also quite straightforward: one only needs to provide some personal details online in order to activate the process. All information is provided both in English and Māori. Further alternatives are also available, such as visiting any PostShop in the country, sending a free text (3676) or by phone (0800-36-76-56) (`https://maorioption.org.nz/not-enrolled/`).

Figure 1: Three screenshots from the Electoral Commission webpage taken during the 2013 Māori Electoral Option





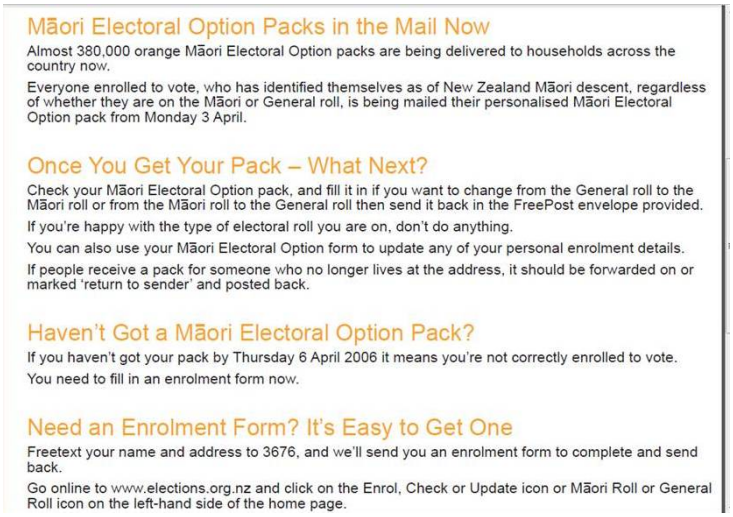
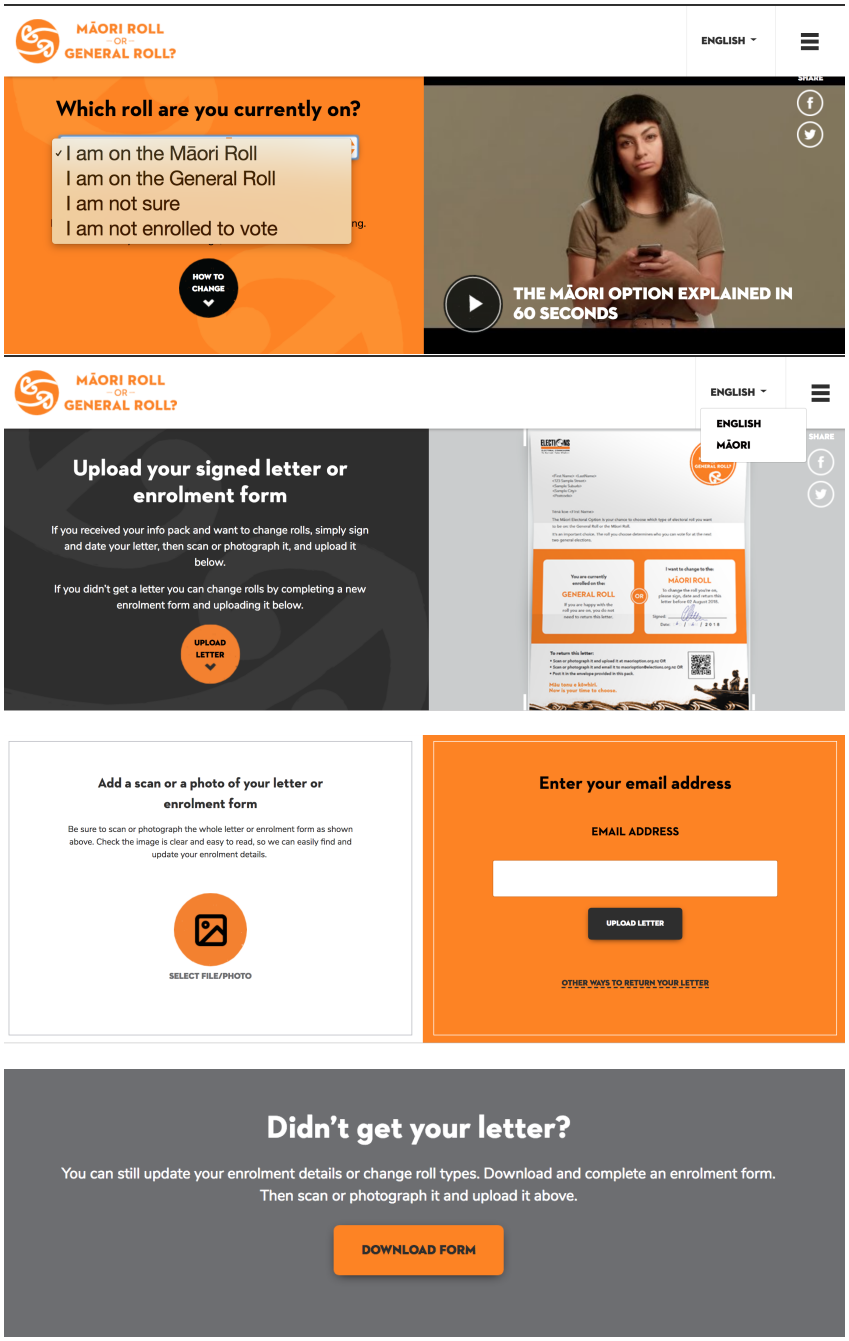


Figure 2: Four screenshots from the Electoral Commission webpage taken during the 2018 Māori Electoral Option



3 Important Dates

- 2005, September 17: General Election
- 2006, March 7: Census Count
- 2006, April 3 – August 2: Māori Electoral Option
- 2006, December 11 – 2007, September 14: Electoral boundary review and final boundaries publication
- 2008, November 8: General Election
- 2011, November 26: General Election
- 2013, March 5: Census Count

- 2013, March 25 – July 24: Māori Electoral Option
- 2013, October 7 – 2014, April 17: Electoral boundary review and final boundaries publication.
- 2014, September 20: General Election

4 Estimation of $g(.)$ in expression (4)

Details here are based on Härdle et al. (2012). The model is

$$Y_i = X_i\beta + g\left(DIFF_i\right) + \varepsilon_i, \tag{1}$$

where Y = %MAO. First, one needs to select the number of gridpoints (J). If the number is, say, 41, this means that one calculates the value of $g\left(DIFF\right)$ at $DIFF = [-1, -0.95, -0.9, ..., 0, ..., 0.95, 1]$. Let ν be a particular set of gridpoints chosen, $\nu = [\nu_1, \nu_2, ..., \nu_j, ..., \nu_J]$.

Next, one must specify how to estimate $g\left(\nu_j\right)$ for a given gridpoint ν_j. One possibility is to assume that all the observations are normally distributed around ν_j, following a Normal distribution with mean ν_j and variance σ_j. As with the number of gridpoints, the variance can be allowed to change in order to have more robust results. The assumption of normality is critical in order to give weights to the different observations. The weight ω_i of each particular observation is given by its distance to the particular gridpoint ν_j. One particular specification is:

$$\begin{aligned}
&\omega_i(\nu_j) = \phi_j(DIFF_i), \quad \text{where} \\
&\phi_j = \text{ p.d.f. of a Normal with mean } \nu_j \text{ and variance } \sigma_j \\
&\text{and of course} \sum_i \omega_i(\nu_j) = 1,
\end{aligned}$$

i.e., the closer $DIFF_i$ is to ν_j, the larger the weight of observation i. Then estimation of $\hat{\beta}_{LS}$ is given by:

$$\begin{aligned}
&\hat{\beta}_{LS} = \left(\tilde{X}'\tilde{X}\right)^{-1}\tilde{X}'\tilde{Y}, \quad \text{where} \\
&\tilde{X}_i = X_i - \sum_{j=1}^{N}\omega_j X_j, \quad \tilde{Y}_i = Y_i - \sum_{j=1}^{N}\omega_j Y_j
\end{aligned}$$

Finally, one can estimate the value of g at ν_j by computing the following:

$$g\left(\nu_j\right) = \sum_{i=1}^{N}\omega_i\left(Y_i - X_i'\hat{\beta}_{LS}\right) \tag{2}$$

All computed J values of $g\left(\nu_j\right)$ may be plotted in a graph.

References

Härdle, Wolfgang, Hua Liang, and Jiti Gao. *Partially linear models.* Springer Science & Business Media, 2012.