Week 18 Lab Exercises

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In Week 16, we formulated the likelihood function for the logistic regression model and then used `R` to maximise it, using an example dataset. Then we extracted the results and compared them to the results returned by the `glm` function in `R`. Do the same thing for the probit model, using the dataset by Pietryka and DeBats (2017), which we already used in the lab session in Week 16.

1. Show the equations for the individual probabilities, the link function, the likelihood function, and the log likelihood for the probit model. Explain them.
2. Show the `R` code for the log likelihood function and for the optimisation as well as for extracting the coefficients, standard errors, and the log likelihood. Do this for Model 3 (the full specification) for Alexandria in Table 1 of the article, and display the respective results in `R`. You can use the `optim` function in `R` and do not need to re-implement the optimisation routine.
3. Explain how the probit model differs from the logit model (in principle, not with regard to the example data) and what a link function is. How are coefficients interpreted in the probit model?

References

Pietryka, M. T. and DeBats, D. A. (2017). It's not just what you have, but who you know: Networks, social proximity to elites, and voting in state and local elections. *American Political Science Review*, 111(2):360–378.