What Can Multilevel Regression and Poststratification Tell Us About the Democratic Deficit in the European Union?[[1]](#footnote-1)\*

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Master’s Thesis Project Proposal

My thesis will attempt to investigate the democratic deficit in the European Union by correlating citizen preferences at the regional level with their elected official’s voting behavior. If I can show some degree of negative (positive) correlation, then I would be able to conclude that there is (not) a democratic deficit. Further, I am interested in applying Bayesian Modeling and Multi-level Regression and Poststratification (MRP) methods in novel settings, particularly using survey data from European countries and analyzing representation at the European Union.

I am also interested in deploying a Bayesian framework of analysis and using the Stan programming language in order to do so. As its name implies, MRP revolves around multilevel (or hierarchical) regression, and its performance can be improved with the inclusion of priors in the modeling phase[[2]](#footnote-2) - not to mention the added benefit of working with a full posterior distribution of estimated preferences, as opposed to point estimates yielded by Frequentist estimations.

MRP is a method that can be used to estimate subnational (or regional) preferences using nationally representative survey data, using partial pooling (random/mixed effects) where ‘small’ units (such as individual voters) reside within ‘big’ units (congressional districts, U.S. states, European countries) to increase the accuracy of the model fit.

The idea is that ‘small’ units have idiosyncratic features unique to the particular ‘big’ unit they reside in, but also have characteristics with other similar ‘small’ units across all of the ‘big’ units in the sample[[3]](#footnote-3). For example, a 20-year-old university educated male in the Ile-de-France region of France will have unique characteristics that he shares with other individuals living in that region, but will also have shared features with 20-year-old educated males in the London region of the U.K. and the North-West region of Italy. Therefore, the first stage of the analysis consists of fitting a multilevel regression on a survey response – for instance support for a certain policy such as abortion restriction or environment regulation using individual level predictors for the ‘small’ unit and predictors for the ‘bigger’ units. The choice of predictors for the bigger units depends on the question under study. For instance, a model analyzing survey responses on attitudes towards abortion might want to include the share of Catholic individuals in the states under study, and a question asking about attitudes towards environmental regulations might want to include the percentage of employment tied to the fossil fuel industry in the states under study.

Once the initial model is fit, the poststratification step consists of using census data to tabulate the actual distribution of the individual level predictors in the population (i.e. counting all of the 20-year-old university educated males in all regions, and then all of the 20-year-old university educated females and so on, for all combination of categories included in the model). These distributions are used as weights to estimate the attitude for the ‘big’ units under study.[[4]](#footnote-4)

My thesis will attempt to fill substantive, geographical and methodological gaps I’ve identified in the literature. First, while MRP has been extensively used to analyze and understand voter preferences[[5]](#footnote-5) and then compare those preferences to the voting behavior of elected officials[[6]](#footnote-6) or by the patterns of rulings given by federal judges[[7]](#footnote-7), the brunt of the research has been applied to the U.S. – where a common language (which simplifies polling and surveying), streamlined political representation across states and congressional districts, as well as census taking, make implementing MRP relatively straightforward. In Europe, MRP has been used to predict political outcomes such as the Brexit vote[[8]](#footnote-8) but has not been used to: 1) model European preferences using a Bayesian framework and 2) correlate the findings with the voting behavior of Members of the European Parliament (MEPs).

With Europe as the geographic area under study, research has so far focused on assessing the quality of predictions produced by MRP by comparing these sub-national level estimates with “true” values produced by the few surveys that do measure sub-national opinions. For instance, using Eurobarometer polling data, Todshov finds that MRP usually performs well in replicating “true” preferences, but that “the approach is less capable of reconstructing the relative rankings of the country means and hitting the range of plausible values of the individual state means”[[9]](#footnote-9). He also highlights the importance of including country level predictors in the multilevel models. Lipp and Schraff conduct a similar study, this time comparing the performance of different methods and algorithms, including disaggregation, “classical” MRP, synthetic MRP (as developed by Leemann and Westfallen)[[10]](#footnote-10), and Bayesian Additive Regression Trees (BART). They conclude that synthetic MRP and BART perform best.[[11]](#footnote-11) However, their analysis relies on Frequentist point estimation, while I am interested in augmenting my analysis with the inclusion of priors, as well as deriving the full posterior distribution of the estimated preferences, for instance by using the Stan programming language.[[12]](#footnote-12)

After conducting the preference estimation using MRP, the second step of the analysis will be to correlate them with roll call votes at the E.U. Parliament. There are two main ways that countries can send elected representatives to the E.U. Parliament: by electing national or regional representatives.[[13]](#footnote-13) In the former, citizens cast their votes for delegates representing a political party and the nationwide results are aggregated and tallied using proportional representation. In the latter, votes are split between electoral constituencies - voters cast ballots for political parties represented at the regional level. My work will focus on the latter case in order to give a form of external validity to the work done by Lax & Phillips, where individual attitudes were correlated with U.S. Senate roll call votes[[14]](#footnote-14). As such, I will assess the subnational preferences of E.U. citizens in 3 countries that have regional constituencies at the E.U. Parliament: France (before 2019), the United Kingdom (before Brexit in 2016) and Italy. Additionally, I could assess the relationship between individual voters and their representatives at the *national* level as a form of comparison. An option would be to use MRP, but Buttice and Highton note that this comes with some caveats: “the key factors we have identified that determine how well MRP performs are the strength of the geographic-level covariates included in the multilevel model of opinion and the ratio of opinion variation across geographic units relative to opinion variation within units When these values are sizable, then MRP will often produce reliable estimates from national surveys of conventional size. However, the empirical analysis suggests that often these conditions will not be satisfied”[[15]](#footnote-15). In the context of my thesis, I will be working with multiple surveys, and often with sample sizes that are large enough to palliate those issues so I am not concerned about this, a priori.

1. \* Sorry for the lazy title, I haven’t had the chance to find a witty pun yet. [↑](#footnote-ref-1)
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