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

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**Introduction**

Political Scientists often turn to surveys to estimate public preferences because understanding preferences is essential to understanding how a democratic system functions. If elected officials act in the name of their constituents, then they need to know what their constituents’ preferences are in order to act accordingly. Conversely, the public may elect politicians because those politicians offer the platforms “closest” to their preferences. While the present study does not address that issue, better understanding citizens’ preferences is invaluable regardless. Even if we cannot ascertain the causal direction between voter preferences and the political behavior of their elected officials, it is important for us to know if those preferences are at least mirrored to some extent by politicians. The existence of a democratic deficit in the European Union (EU) has been a matter of controversy in academia[[2]](#footnote-2), in the media[[3]](#footnote-3) and has very real implications for policymakers in Europe – politicians and voters in favor of Brexit, the divorce between Great Britain and the EU, heavily relied on the idea to gain legitimacy and ultimately win the vote.[[4]](#footnote-4) At the heart of the controversy lies the aforementioned question: are European citizens actually represented by the EU? If not, then what drives the voting behaviors of the Members of the European Parliament (MEPs), the only democratically elected officials that make up the EU government? These questions have important implications, but also present an opportunity to better understand the link between citizen preferences and the behavior of their elected officials.

As such, 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. 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[[5]](#footnote-5) - 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.

**Literature Review**

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[[6]](#footnote-6) and then compare those preferences to the voting behavior of elected officials[[7]](#footnote-7) or by the patterns of rulings given by federal judges[[8]](#footnote-8), 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[[9]](#footnote-9) 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”[[10]](#footnote-10). 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)[[11]](#footnote-11), and Bayesian Additive Regression Trees (BART). They conclude that synthetic MRP and BART perform best.[[12]](#footnote-12) 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.[[13]](#footnote-13)

**Data and Methods**

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[[14]](#footnote-14). 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.[[15]](#footnote-15)

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.[[16]](#footnote-16) 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[[17]](#footnote-17). 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”[[18]](#footnote-18). 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.

As such, my thesis will need 3 pieces of data:

1. **Survey data for the target countries** (preference estimation)

The survey data will mainly come from Eurobarometer.

The Flash Eurobarometer surveys have a lot of survey questions about special subjects (the environment, EU integration, LQBTQ+ policies etc.). <https://www.gesis.org/en/eurobarometer-data-service/survey-series/flash-eb>

Regular Eurobarometer polls also have the advantage of including data at the NUTS3 subnational unit, which will be invaluable to cross-validate the preferences obtained via MRP (by comparing MRP and disaggregated preferences).

A list of all previous Eurobarometer reports can be found here: <https://dbk.gesis.org/dbksearch/gdesc2.asp?no=0008&search=&search2=&db=e&tab=0&notabs=&nf=1&af=&ll=10>

There are many different datasets spanning the recent years, but my analysis will probably focus on surveys conducted in the 2010s. Eurobarometer polls are known for being rigorously constructed and have often been used in the literature I have reviewed, therefore I don’t anticipate sampling or missing data to be major issues. All Eurobarometer polls have an adequate amount of respondents for the countries I am interested in working with, and there is always the possibility of aggregating different polls to facilitate preference estimation.

1. **Census data (for postratification)**

Post-stratifying involves readjusting preferences at the subnational level by calculating

demographic weights. The literature I have reviewed uses 2011 census data available at <https://ec.europa.eu/eurostat/web/population-and-housing-census/census-data/2011-census>

and there additional options to use 2001 census data as well (a more general link to census data in the EU: <https://ec.europa.eu/eurostat/web/population-and-housing-census/census-data/database>)

1. **European Parliament Roll Call Votes**

Finally, the sub-national preferences will be correlated to MEP votes, which can be accessed in raw format at: <https://parltrack.org/dumps> (under the MEP Plenary votes tab). I have already started perusing the votes, and the format is quite unwieldy because the format is in a json file. Therefore I plan on using pre-made scorecards on MEP voting records to guide which legislation I should be looking at when analyzing votes: <http://www.caneurope.org/publications/blogs/718-mep-scorecards-ranking-european-parliamentarians-on-climate-action>

<https://www.score-ep.org/>

Once the votes are read in, they can be tallied and aggregated into an index score for an MEP’s performance on a certain issue. For instance, an MEP voting in favor of environmental regulation will receive +1 on that vote, 0 if he abstains and -1 if he votes against it.

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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