**Statistical Design Consulting**

**SEMESTER REPORT**

**Fall 2024**

**Client:** Hanna Sistek  **File Number:** 23-056

**Department:** Political Science **Major Prof:** Dr. Cherie Maestas

**Consultant:** Sumeeth Guda **Follow Up Date:** 09/10/24

**Meeting Attendees:** Hanna Sistek, Sumeeth Guda, Dr. Cherie Maestas, Dr. Bruce Craig

**Statement of Problem:**

To test a reputational cost theory of disinformation dissemination by political elites and to measure the impact of media fractionalization on the disinformation.

**Goal of This Project:** Journal Publication, PhD Dissertation

**Background:**

The client is a PhD student in Political Science who needs help analyzing their data and understanding their results pertaining to how disinformation and bias within media impacts the political polarization amongst various countries. Specifically analyzing the polarization gap from years before and after 2016. The time span of her current data she is focusing on the years between 2018-2023. Her data comes from the survey organization V-Dem which rated over 100 countries based on polarization and disinformation criterion for democratic governments. The expert raters rate the country’s polarization on a scale from [-5, +5] . From this data, the client developed a theory with respect to the reputational cost to answer the following research questions:

1. Politicians in democracies should care about reputation for re-election chances. So why risk it by disseminating disinformation?
2. What explains the global variation in disinformation dissemination domestically by political elites?

Originally the client was continuing in the summer of 2024, and they needed help fitting their data using plm(). Specifically, she was having predictors being dropped from the model without explanation. Because plm() is a specialized mixed-effect program, we suggested using the more flexible LMM software for analysis. The methodologies and analysis techniques would be discussed during the fall semester.

The ultimate goal for the client is to create a model to test their theory about the tradeoff between reputational cost for politicians and increasing disinformation and political polarization to emerge as key actors in a majoritarian system.

The client is in their analysis phase where all of the data has been collected.

**Progress During Current Semester:**

This project was a carryover from summer, since there was a lot of issues with the dataset and fitting issues, in addition to understanding what Hanna wanted to show using her data. She had the issue where when she tried fitting a mixed effect model, then ultimately her intercepts for each of her countries differed significantly, however the slopes were the same which wasn’t expected from the data itself. The procedure that Sumeeth and Hanna did this past semester was the following:

1. Have 3 separate data frames: Majoritarian, Non-Majoritarian, All countries
2. Fit the following model:
   1. Lmer(disinfo ~ media\_frac\*polarization + (1|country) + (1|country:media\_frac) + (1|country:polarization) + [Control variables].
   2. Fit the above model to all of the datasets
3. Use AICC to compare the models against each other and observe the fittings.

In the month of September, the major focus was rescaling and cleaning the datasets to make sure the lmer models could converge to the results. This took a bit of trial and error, but Hanna was able to make her datasets.

In the month of October, the focus was to do fittings of the models to the mixed effects and do residual analysis on various time periods to identify outliers and give Hanna use cases to present to her advisor. AICC was used to determine the best model, however there were some underfitting issues within the data which were remedied with suggestions from Dr. Craig.

In the month of November, Dr. Maestas wanted Hanna to make marginal effect plots similar to the results shown in various journals. This proved to be tricky since the complexity of the model produced unreadable results on the visuals. Hence more cleaning had to be employed to get visuals for the marginal effects of polarization and media fractionalization.

Overall, Hanna felt that she had enough help from the SCS for this project and theory chapter of her dissertation. She said that she will likely not work on this project in the Spring semester as she is working on another project with the SCS that will take priority over this paper. For the time being with respect to this project, Hanna has completed this one for the time being.

**Current Status: Complete.**