Universidade de São Paulo / Faculdade de Filosofia, Letras e Ciências Humanas

Departamento de Ciência Política

FLP-468 & FLS-6183

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Interactions Lab

This lab is based on the following paper and corresponding replication files:

William Roberts Clark, Michael Gilligan and Matt Golder. 2006. "A Simple Multivariate Test for Asymmetric Hypotheses." *Political Analysis* 14: 311-331.

In this lab, we are going to focus on exploring interactions further. The model we will study can be summarized as:

$$Y = \alpha + \beta_1 X + \beta_2 Z + \beta_3 XZ + u$$

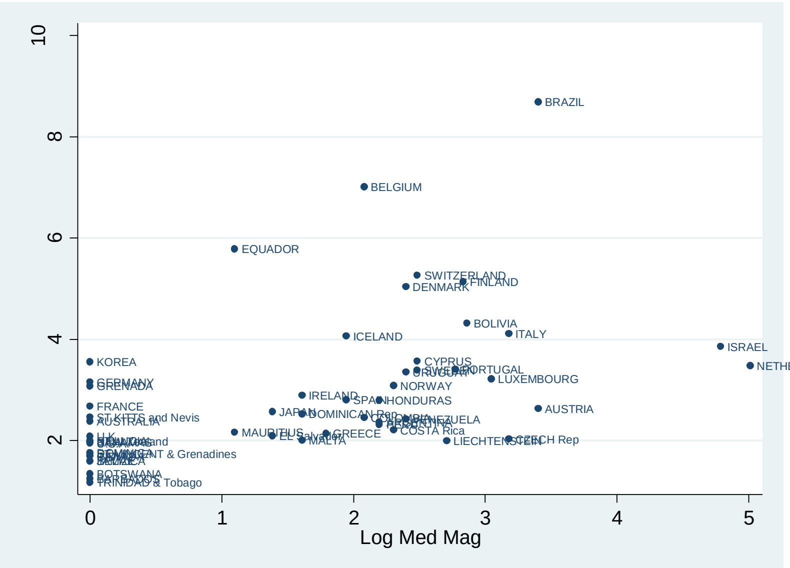
We are going to examine the effects of changes in Z and changes in X on Y in two cases: a) Z is a dichotomous variable, and; b) Z is a continuous variable using simulations.

For the first part of the lab, you will need to work in Stata using the do file for Class 6, Cox.do. This is the do file provided by Clark, Gilligan and Golder (2006).

Duverger's (1954) theory is well-known in drawing attention to multi-member electoral districts as being necessary to produce a multiparty system (see Figure 1). We will explore this argument using the data collected and reported in:

Amorim Neto, Octavio & Gary Cox. 1997. "Electoral Institutions: Cleavage Structures and the Number of Parties." *American Journal of Political Science* 41: 149-174.

Figure 1. Number of Legislative Parties and Log Median District Magnitude



Specifically, Duverger argued that social forces are more likely to produce additional parties when countries employ multimember districts than when they do not. We will test Duverger's claims on the determinants of party system size with the following model:

$$\text{Legislative Parties} = \beta_0 + \beta_1 \text{Multimember District} + \beta_2 \text{Social Heterogeneity} + \beta_3 \text{Multimember District} \times \text{Social Heterogeneity} + \varepsilon$$

As Clark, Gilligan and Golder (2006) summarize, "Duverger's theory leads us to believe that both multi-member districts and social heterogeneity are necessary, but not sufficient, to produce more legislative parties." In other words, this implies that $\beta 1 = \beta 2 = 0$ and that $\beta 3 > 0$.

Part I. X and Z are dichotomous variables

Exercise 1. First, we are going to test the hypotheses by analyzing the results reported for the following regression:

$$\text{Legislative Parties} = \beta_0 + \beta_1 \text{Multimember District} + \beta_2 \text{Social Heterogeneity} + \beta_3 \text{Multimember District} \times \text{Social Heterogeneity} + \varepsilon$$

where

Legislative Parties = effective number of legislative parties;

Multimember District = dichotomous variable indicating whether a country has single- or multi-member districts; and,

Social Heterogeneity = dichotomous variable indicating whether a country is ethnically heterogeneous (more ethnic groups than the median country) or ethnically homogenous (less ethnic groups than the median country).

a) Please estimate the regression model and discuss whether what the results reveal about the effect of ethnic diversity and district type on party size.

b) Now, let's examine the model's predictions on the effective number of legislative parties depending on both social heterogeneity and district type. Please fill in the following table and include the commands in your do-file.

Table 3. The Predicted Number of Legislative Parties

Social Heterogeneity	Single-Member Districts	Multi-Member Districts
Heterogeneous		
Homogenous		

Part II. X and Z are continuous variables.

Exercise 2. We will now treat multi-member district magnitude and ethnic diversity as continuous variables. Our revised model is:

$$\text{Legislative Parties} = \gamma_0 + \gamma_1 \ln(\text{Median District Magnitude}) + \gamma_2 \text{Social Heterogeneity} + \gamma_3 \ln(\text{Median District Magnitude}) \times \text{Social Heterogeneity} + \varepsilon$$

a) Please estimate the revised model and discuss whether what the results reveal about the effect of ethnic diversity and district type on party size. Do the results confirm earlier findings?

b) To determine exactly how large the district magnitude needs to be for social heterogeneity to have its hypothesized positive effect on party system size, we need to calculate marginal effect of social heterogeneity ($\gamma_1 + \gamma_3$ ln (District Magnitude) and its associated confidence intervals across the observed range of district magnitudes. To do so, let's first examine the model's predictions using the margins command in Stata, which we learned in class last week. Margins uses the delta method approximation to examine how small changes in the explanatory variable affects the dependent variable. Try to use this command to examine the effect of district magnitudes and heterogeneity on party size. What are some reasonable criteria to use in such an estimation?

c) Next, let`s replicate the Clark, Gilligan and Golder (2006) marginal effect plot of the marginal effect of social heterogeneity across a range of district magnitudes on the number of parties (our dependent variable) using the code provided by Guy Whitten. What additional insights do you gain from this plot?

   Case 1) The effect of social heterogeneity across a range of district magnitudes.

d) Next, let`s do a second marginal effect plot that is not reported by Clark, Gilligan and Golder (2006) of the marginal effect of district magnitudes across a range of levels of social heterogeneity on the number of parties (our dependent variable) using the code provided by Guy Whitten. What additional insights do you gain from this plot?

   Case 2) The effect of district magnitudes across a range of levels of ethnic heterogeneity.

Exercise 3. Clark, Gilligan and Golder (2006) argue that "We should note that our interaction model allows us to talk about degrees of "necessity" or degrees of "sufficiency." For example, the magnitude of the coefficient on the cause that is purported to be necessary, but not sufficient, is a measure of "sufficiency." Conversely, the magnitude of the coefficient on the interaction term is a measure of the extent to which the purported cause is necessary. If b1 is large relative to b3 (and they have the same sign), the more "sufficient" is X1 and the less "necessary" is X2 for Y. Similarly, if b2 is large relative to b3, the less "necessary" is X1 and the more "sufficient" is X2 for Y. Do you agree? Explain with figures to illustrate your reasoning.

Exercise 4. Go back and look at the descriptive statistics for the explanatory variables. Do any of your findings change considering the distribution of cases?