

POLI706: Advanced Methods of Political Analysis

Problem set 8

This assignment allows you to explore and present your understanding of key concepts related to different types of variables and their interrelationships.

- First, run the following R codes and load necessary packages to use.

```
library(broom);library(tidyverse)
if (!require("devtools")) install.packages("devtools")
if (!require("vdemdata"))
  ↪ devtools::install_github("https://github.com/vdeminstitute/vdemdata")
vdemdata::vdem |> as_tibble() -> vdem_df
```

- Subset the sample as follows:

```
# Subset the sample data
vdem_df |>
  dplyr::select(country_name, COWcode, year,
                v2x_polyarchy, e_boix_regime, e_gdppc) |>
  dplyr::filter(year == 2015) -> sample

sample |>
  mutate(e_boix_regime =
    factor(e_boix_regime, levels = c(0, 1),
           labels = c("Autocracy", "Democracy")))
  ↪ ->
  sample_fct
```

Collaborate and discuss extensively, write exclusively in your own voice. You can find readings from the learning module.

Exercise 1

Aside from the ID variables (i.e., `country_name`, `COWcode`, `year`), explain what each variable is capturing, and its level of measurement (if numerical, explain whether it is discrete or continuous, and whether it is a ratio variable).

Hint: You will need the codebook. Googling the variable name takes you right to a useful webpage (https://v-dem.net/documents/38/V-Dem_Codebook_v14.pdf).

Exercise 2

Using the sample data, specify a regression model in the form of, $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$, where y is your outcome—GDP per capita (`e_gdppc`), and x_1 is Electoral Democracy Index (`v2x_polyarchy`) and x_2 is Dichotomous measurement of democracy (`e_boix_regime`).

- Explain the models in detail.
- Estimate the intercept, slopes, standard errors (all!), and variance of the error. Describe each item in a short write-up. Make all comparisons between these quantities that make sense.
- Describe what the plot below suggests. Do you really care what β_1 and β_2 are? How are they different?

