

# PSCI 3200 Final Project

## Part I: Final Project Proposal

### Research Question

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Is there a relationship between Foreign Aid (and/or Foreign Direct Investment) and Corruption in Developing Countries? I wrote my PPE Capstone paper on the relationship between Foreign Direct Investments (FDIs) and Corruption. I am interested in determining if foreign aid/investment improves or worsens corruptions, and under what conditions...

### Hypothesis

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I imagine that this project will use Corruption levels as the Dependent Variable and Level/Type of Foreign Aid/Direct Investment as the Independent Variable. I also imagine that the type of political institution, trustworthiness of leaders, and location (which will make the analysis more complex) will impact the relationship between my two variables, which I will need help to control for and think through.

### Proposes a dataset and measures that will help you answer it

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I hope to use datasets that measure the type/level of foreign aid a country receives, how those funds are used, the political stability of the country, and levels (or perceived levels) of corruption. I believe that AidData, World Bank Governance Indicators, and Transparency International's Corruption Perception Index will help, but I am open to exploring other data.

## Part II: Final Project Research Design

### Describe your research question and provide some background on why you find it interesting or important

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My research question examines the causal relationship between foreign aid and corruption and the moderating effect of democracy. In other words, I am hoping to explore the relationship between foreign aid and corruption while testing whether democracy interacts with foreign aid to produce corruption outcomes. I am interested in exploring this topic because much research has been done on the impact of foreign aid on variables such as economic growth and corruption, but there has not been an exploration of democracy as a moderating effect on foreign aid and outcomes. However, my early exploration is inspired by Aid, Policies, and Growth By Craig Burnside and David Dollar, which found that foreign aid has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies but has little effect in the presence of poor policies. Similarly, a study called The effect of foreign aid on corruption: A quantile regression approach by Keisuke Okada and Sovannroeun Samreth found that foreign aid generally reduces corruption, and its reduction effect is greater in less corrupt countries. These academic articles demonstrate a moderating effect from foreign aid on outcomes, something I wish to explore further.

### State at least one testable hypothesis

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I hypothesize that foreign aid causes an increase in corruption in countries with low democracy scores but decreases corruption in countries with high democracy scores. I base this hypothesis on the fact that earlier research indicates that foreign aid has different circumstances where it can succeed in outcomes like economic growth and corruption. The main reason that I expect a negative effect on corruption from an interaction between foreign aid and democracy is because of the idea that democracies have greater institutions that ensure transparency and accountability, leading to greater allocation of resources and less corrupt practices. However, countries that have less democratic institutions can expect to have weaker mechanisms that monitor the allocation of foreign aid and resources in general. This argument is also supported by past research that I cited above, where stronger institutions have a greater effect on foreign aid success and economic growth. As a result, democratic institutions, as opposed to authoritarian ones, will have a greater impact on reducing corruption, whereas non-democratic regimes will be bolstered by foreign aid, increasing corruption

### Briefly discuss the specific variables you will use to test your hypothesis and the dataset they are drawn from

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The main variables that I am using are official development assistance (ODA), democracy, and corruption data. I am using data from the World Bank, Freedom House, and Corruption Perception Index, respectively. I am using panel data using country and year.

```
library(readxl)
library(ggplot2)
library(tidyverse)
```

```
— Attaching core tidyverse packages — tidyverse 2.0.0 —
✓ dplyr      1.1.4    ✓ readr      2.1.5
✓ forcats    1.0.0    ✓ stringr    1.5.1
✓ lubridate  1.9.3    ✓ tibble     3.2.1
✓ purrr      1.0.2    ✓ tidyr      1.3.1
— Conflicts — tidyverse_conflicts() —
✖ dplyr::filter() masks stats::filter()
✖ dplyr::lag()     masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
# corruption perception index
cpi <- read_excel("/Users/radnerp/Documents/GitHub/psci3200-radwan/Data/CI-CPI.xlsx")
cpi_score <- cpi %>%
  filter(Indicator == "Corruption Perceptions Index Score")

cpi_score_long <- cpi_score %>%
  pivot_longer(
    cols = `2012`:`2023`,
    names_to = "Year",
    values_to = "Value"
  ) %>%
  select(`Economy Name`, `Value`, `Year`)

#democracy index, freedom house
democracy <- read_excel("/Users/radnerp/Documents/GitHub/psci3200-radwan/Data/All_data_FIW_2013-2024.xlsx")
```

New names:

- `` -> `...2`
- `` -> `...3`
- `` -> `...4`
- `` -> `...5`
- `` -> `...6`
- `` -> `...7`
- `` -> `...8`
- `` -> `...9`
- `` -> `...10`
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- `` -> `...37`
- `` -> `...38`
- `` -> `...39`
- `` -> `...40`
- `` -> `...41`

- `` -> `...42`
- `` -> `...43`
- `` -> `...44`

```
colnames(democracy) <- democracy[1, ]
democracy <- democracy[-1, ]

democracy <- democracy %>%
  select(`Country/Territory`, Edition, Total)

#Official development assistance
oda <- read.csv("/Users/radnerp/Documents/GitHub/psci3200-radwan/Data/API_DT.ODA.ALLD.KD_DS2_en_csv_v2_14437/API_DT.ODA.ALLD.KD_DS2_en_csv_v2_14437.csv")

oda_long <- oda %>%
  pivot_longer(cols = starts_with("X"), names_to = "Year", values_to = "Value") %>%
  mutate(Year = as.numeric(gsub("X", "", Year))) # Remove 'X' prefix and convert to numeric

oda_long <- oda_long %>%
  select(Country.Name, Year, Value)

#merge all three by year and country
colnames(democracy) <- c("Country", "Year", "Democracy_Score")
colnames(cpi_score_long) <- c("Country", "CPI_Score", "Year")
colnames(oda_long) <- c("Country", "Year", "ODA_Value")

# year is numeric
democracy <- democracy %>% mutate(Year = as.numeric(Year))
cpi_score_long <- cpi_score_long %>% mutate(Year = as.numeric(Year))

# Country and Year
merged_data <- cpi_score_long %>%
  full_join(democracy, by = c("Country", "Year")) %>%
  full_join(oda_long, by = c("Country", "Year"))

#change columns to numeric
merged_data <- merged_data %>%
  mutate(across(CPI_Score:ODA_Value, as.numeric))

merged_data$Year <- as.factor(merged_data$Year)

#regression
regression <- lm(CPI_Score ~ ODA_Value * Democracy_Score + Country + Year, merged_data)
summary(regression)
```

Call:

```
lm(formula = CPI_Score ~ ODA_Value * Democracy_Score + Country +
    Year, data = merged_data)
```

Residuals:

```
      Min       1Q   Median       3Q      Max
-9.0487 -1.4332 -0.0528  1.3721 12.3233
```

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	5.269e+00	1.708e+00	3.084	0.002099
ODA_Value	1.439e-09	4.614e-10	3.118	0.001876
Democracy_Score	2.092e-01	2.010e-02	10.404	< 2e-16
CountryAlbania	1.546e+01	1.731e+00	8.931	< 2e-16
CountryAlgeria	2.138e+01	1.649e+00	12.962	< 2e-16
CountryAngola	1.058e+01	1.655e+00	6.395	2.46e-10
CountryArgentina	1.458e+01	1.839e+00	7.926	6.09e-15
CountryArmenia	2.345e+01	1.646e+00	14.246	< 2e-16
CountryAzerbaijan	1.925e+01	1.743e+00	11.040	< 2e-16
CountryBangladesh	8.631e+00	1.368e+00	6.310	4.20e-10
CountryBelarus	2.973e+01	1.735e+00	17.134	< 2e-16
CountryBenin	1.764e+01	1.814e+00	9.722	< 2e-16
CountryBhutan	4.861e+01	1.679e+00	28.949	< 2e-16
CountryBolivia	1.208e+01	1.740e+00	6.946	6.82e-12
CountryBosnia and Herzegovina	1.948e+01	1.669e+00	11.675	< 2e-16

CountryBotswana	3.955e+01	1.765e+00	22.400	< 2e-16
CountryBrazil	1.629e+01	1.841e+00	8.851	< 2e-16
CountryBurkina Faso	2.236e+01	1.639e+00	13.640	< 2e-16
CountryBurundi	8.450e+00	1.601e+00	5.278	1.60e-07
CountryCabo Verde	3.256e+01	1.924e+00	16.919	< 2e-16
CountryCambodia	8.358e+00	1.507e+00	5.546	3.75e-08
CountryCameroon	1.424e+01	1.489e+00	9.564	< 2e-16
CountryCentral African Republic	1.499e+01	1.616e+00	9.273	< 2e-16
CountryChad	9.504e+00	1.573e+00	6.042	2.16e-09
CountryChile	4.343e+01	2.062e+00	21.066	< 2e-16
CountryChina	3.240e+01	1.949e+00	16.623	< 2e-16
CountryColombia	1.798e+01	1.722e+00	10.439	< 2e-16
CountryComoros	7.554e+00	1.664e+00	4.540	6.33e-06
CountryCosta Rica	3.104e+01	1.925e+00	16.121	< 2e-16
CountryCote d'Ivoire	1.755e+01	1.577e+00	11.133	< 2e-16
CountryCuba	3.694e+01	1.598e+00	23.121	< 2e-16
CountryDjibouti	1.953e+01	1.665e+00	11.729	< 2e-16
CountryDominica	3.078e+01	1.969e+00	15.629	< 2e-16
CountryDominican Republic	9.608e+00	1.748e+00	5.496	4.94e-08
CountryEcuador	1.552e+01	1.704e+00	9.109	< 2e-16
CountryEl Salvador	1.513e+01	1.744e+00	8.677	< 2e-16
CountryEquatorial Guinea	9.228e+00	1.900e+00	4.857	1.39e-06
CountryEritrea	1.381e+01	1.826e+00	7.562	9.05e-14
CountryEswatini	2.586e+01	1.764e+00	14.664	< 2e-16
CountryEthiopia	2.083e+01	1.161e+00	17.942	< 2e-16
CountryFiji	3.492e+01	2.354e+00	14.834	< 2e-16
CountryGabon	2.039e+01	1.676e+00	12.166	< 2e-16
CountryGeorgia	3.561e+01	1.701e+00	20.927	< 2e-16
CountryGhana	2.073e+01	1.949e+00	10.636	< 2e-16
CountryGrenada	2.807e+01	1.979e+00	14.189	< 2e-16
CountryGuatemala	9.726e+00	1.659e+00	5.862	6.21e-09
CountryGuinea	1.157e+01	1.598e+00	7.238	9.10e-13
CountryGuinea-Bissau	3.832e+00	1.650e+00	2.322	0.020436
CountryGuyana	1.415e+01	1.769e+00	7.995	3.60e-15
CountryHaiti	4.052e+00	1.549e+00	2.615	0.009059
CountryHonduras	1.083e+01	1.614e+00	6.709	3.28e-11
CountryIndia	1.854e+01	1.931e+00	9.600	< 2e-16
CountryIndonesia	1.706e+01	1.705e+00	10.007	< 2e-16
CountryIraq	5.196e+00	1.354e+00	3.839	0.000132
CountryJamaica	1.986e+01	1.793e+00	11.077	< 2e-16
CountryJordan	3.324e+01	1.339e+00	24.818	< 2e-16
CountryKazakhstan	2.085e+01	1.699e+00	12.270	< 2e-16
CountryKenya	1.042e+01	1.505e+00	6.924	7.87e-12
CountryKosovo	1.935e+01	1.645e+00	11.765	< 2e-16
CountryLebanon	1.085e+01	1.552e+00	6.992	4.98e-12
CountryLesotho	2.208e+01	1.726e+00	12.789	< 2e-16
CountryLiberia	1.357e+01	1.687e+00	8.043	2.49e-15
CountryLibya	6.339e+00	1.670e+00	3.795	0.000156
CountryMadagascar	8.549e+00	1.647e+00	5.191	2.53e-07
CountryMalawi	1.325e+01	1.710e+00	7.750	2.27e-14
CountryMalaysia	3.328e+01	1.668e+00	19.948	< 2e-16
CountryMaldives	2.143e+01	1.743e+00	12.293	< 2e-16
CountryMali	1.544e+01	1.503e+00	10.270	< 2e-16
CountryMauritania	1.564e+01	1.618e+00	9.662	< 2e-16
CountryMauritius	2.768e+01	1.904e+00	14.540	< 2e-16
CountryMexico	1.160e+01	1.710e+00	6.780	2.06e-11
CountryMoldova	1.481e+01	1.699e+00	8.716	< 2e-16
CountryMongolia	1.282e+01	1.890e+00	6.783	2.02e-11
CountryMontenegro	2.444e+01	1.735e+00	14.089	< 2e-16
CountryMorocco	2.369e+01	1.483e+00	15.975	< 2e-16
CountryMozambique	9.487e+00	1.562e+00	6.072	1.80e-09
CountryMyanmar	1.269e+01	1.375e+00	9.232	< 2e-16
CountryNamibia	2.868e+01	1.800e+00	15.935	< 2e-16
CountryNepal	1.375e+01	1.617e+00	8.502	< 2e-16
CountryNicaragua	9.114e+00	1.598e+00	5.702	1.57e-08
CountryNiger	1.596e+01	1.593e+00	10.017	< 2e-16
CountryNigeria	8.782e+00	1.440e+00	6.098	1.54e-09
CountryNorth Macedonia	1.994e+01	1.701e+00	11.724	< 2e-16
CountryPakistan	1.424e+01	1.393e+00	10.222	< 2e-16
CountryPanama	1.319e+01	1.843e+00	7.156	1.61e-12
CountryPapua New Guinea	8.641e+00	1.697e+00	5.093	4.22e-07
CountryParaguay	8.228e+00	1.714e+00	4.801	1.82e-06

CountryPeru	1.550e+01	1.770e+00	8.755	< 2e-16
CountryPhilippines	1.587e+01	1.685e+00	9.420	< 2e-16
CountryRwanda	4.106e+01	1.463e+00	28.065	< 2e-16
CountrySao Tome and Principe	2.144e+01	1.838e+00	11.665	< 2e-16
CountrySenegal	2.253e+01	1.829e+00	12.319	< 2e-16
CountrySerbia	1.858e+01	1.788e+00	10.387	< 2e-16
CountrySeychelles	3.835e+01	1.915e+00	20.028	< 2e-16
CountrySierra Leone	1.157e+01	1.730e+00	6.686	3.82e-11
CountrySolomon Islands	1.997e+01	1.877e+00	10.637	< 2e-16
CountrySomalia	4.522e-01	1.363e+00	0.332	0.740161
CountrySouth Africa	2.135e+01	1.889e+00	11.305	< 2e-16
CountrySouth Sudan	2.301e+00	1.323e+00	1.739	0.082392
CountrySri Lanka	2.035e+01	1.654e+00	12.304	< 2e-16
CountrySt. Lucia	3.397e+01	1.949e+00	17.431	< 2e-16
CountrySt. Vincent and the Grenadines	3.461e+01	1.935e+00	17.888	< 2e-16
CountrySudan	5.574e+00	1.401e+00	3.978	7.47e-05
CountrySuriname	1.755e+01	1.797e+00	9.768	< 2e-16
CountryTajikistan	1.450e+01	1.643e+00	8.827	< 2e-16
CountryTanzania	1.745e+01	1.551e+00	11.246	< 2e-16
CountryThailand	2.260e+01	1.658e+00	13.630	< 2e-16
CountryTimor-Leste	1.532e+01	1.735e+00	8.827	< 2e-16
CountryTogo	1.451e+01	1.635e+00	8.879	< 2e-16
CountryTunisia	2.097e+01	1.772e+00	11.832	< 2e-16
CountryTurkmenistan	1.194e+01	1.838e+00	6.493	1.33e-10
CountryUganda	1.123e+01	1.398e+00	8.037	2.61e-15
CountryUkraine	1.080e+01	1.693e+00	6.383	2.66e-10
CountryUruguay	4.605e+01	2.087e+00	22.059	< 2e-16
CountryUzbekistan	1.439e+01	1.569e+00	9.175	< 2e-16
CountryVanuatu	2.175e+01	1.966e+00	11.066	< 2e-16
CountryZambia	1.765e+01	1.648e+00	10.710	< 2e-16
CountryZimbabwe	9.451e+00	1.542e+00	6.129	1.28e-09
Year2014	5.202e-01	3.435e-01	1.514	0.130231
Year2015	1.186e-01	3.471e-01	0.342	0.732574
Year2016	6.051e-01	3.438e-01	1.760	0.078675
Year2017	7.477e-01	3.409e-01	2.194	0.028500
Year2018	9.003e-01	3.437e-01	2.619	0.008949
Year2019	1.102e+00	3.448e-01	3.197	0.001431
Year2020	1.352e+00	3.488e-01	3.875	0.000114
Year2021	1.514e+00	3.448e-01	4.391	1.25e-05
Year2022	1.341e+00	3.512e-01	3.818	0.000143
ODA_Value:Democracy_Score	-2.278e-11	7.778e-12	-2.928	0.003485

(Intercept)	**
ODA_Value	**
Democracy_Score	***
CountryAlbania	***
CountryAlgeria	***
CountryAngola	***
CountryArgentina	***
CountryArmenia	***
CountryAzerbaijan	***
CountryBangladesh	***
CountryBelarus	***
CountryBenin	***
CountryBhutan	***
CountryBolivia	***
CountryBosnia and Herzegovina	***
CountryBotswana	***
CountryBrazil	***
CountryBurkina Faso	***
CountryBurundi	***
CountryCabo Verde	***
CountryCambodia	***
CountryCameroon	***
CountryCentral African Republic	***
CountryChad	***
CountryChile	***
CountryChina	***
CountryColombia	***
CountryComoros	***
CountryCosta Rica	***
CountryCote d'Ivoire	***

CountryCuba	***
CountryDjibouti	***
CountryDominica	***
CountryDominican Republic	***
CountryEcuador	***
CountryEl Salvador	***
CountryEquatorial Guinea	***
CountryEritrea	***
CountryEswatini	***
CountryEthiopia	***
CountryFiji	***
CountryGabon	***
CountryGeorgia	***
CountryGhana	***
CountryGrenada	***
CountryGuatemala	***
CountryGuinea	***
CountryGuinea-Bissau	*
CountryGuyana	***
CountryHaiti	**
CountryHonduras	***
CountryIndia	***
CountryIndonesia	***
CountryIraq	***
CountryJamaica	***
CountryJordan	***
CountryKazakhstan	***
CountryKenya	***
CountryKosovo	***
CountryLebanon	***
CountryLesotho	***
CountryLiberia	***
CountryLibya	***
CountryMadagascar	***
CountryMalawi	***
CountryMalaysia	***
CountryMaldives	***
CountryMali	***
CountryMauritania	***
CountryMauritius	***
CountryMexico	***
CountryMoldova	***
CountryMongolia	***
CountryMontenegro	***
CountryMorocco	***
CountryMozambique	***
CountryMyanmar	***
CountryNamibia	***
CountryNepal	***
CountryNicaragua	***
CountryNiger	***
CountryNigeria	***
CountryNorth Macedonia	***
CountryPakistan	***
CountryPanama	***
CountryPapua New Guinea	***
CountryParaguay	***
CountryPeru	***
CountryPhilippines	***
CountryRwanda	***
CountrySao Tome and Principe	***
CountrySenegal	***
CountrySerbia	***
CountrySeychelles	***
CountrySierra Leone	***
CountrySolomon Islands	***
CountrySomalia	
CountrySouth Africa	***
CountrySouth Sudan	.
CountrySri Lanka	***
CountrySt. Lucia	***
CountrySt. Vincent and the Grenadines	***

```

CountrySudan          ***
CountrySuriname       ***
CountryTajikistan     ***
CountryTanzania       ***
CountryThailand        ***
CountryTimor-Leste    ***
CountryTogo           ***
CountryTunisia        ***
CountryTurkmenistan   ***
CountryUganda         ***
CountryUkraine        ***
CountryUruguay        ***
CountryUzbekistan     ***
CountryVanuatu        ***
CountryZambia         ***
CountryZimbabwe       ***
Year2014
Year2015
Year2016              .
Year2017              *
Year2018              **
Year2019              **
Year2020              ***
Year2021              ***
Year2022              ***
ODA_Value:Democracy_Score **
---

```

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.552 on 990 degrees of freedom

(16724 observations deleted due to missingness)

Multiple R-squared: 0.9603, Adjusted R-squared: 0.9552

F-statistic: 188.5 on 127 and 990 DF, p-value: < 2.2e-16

```

#visual

ggplot(merged_data, aes(x = ODA_Value * Democracy_Score, y = CPI_Score)) +
  geom_point(alpha = 0.5) + # Scatter plot with transparency
  geom_smooth(method = "lm", color = "red") + # Regression line
  labs(
    x = "ODA Value * Democracy Score",
    y = "CPI Score",
    title = "Regression Analysis: CPI Score vs. ODA * Democracy Score"
  ) +
  theme_minimal()

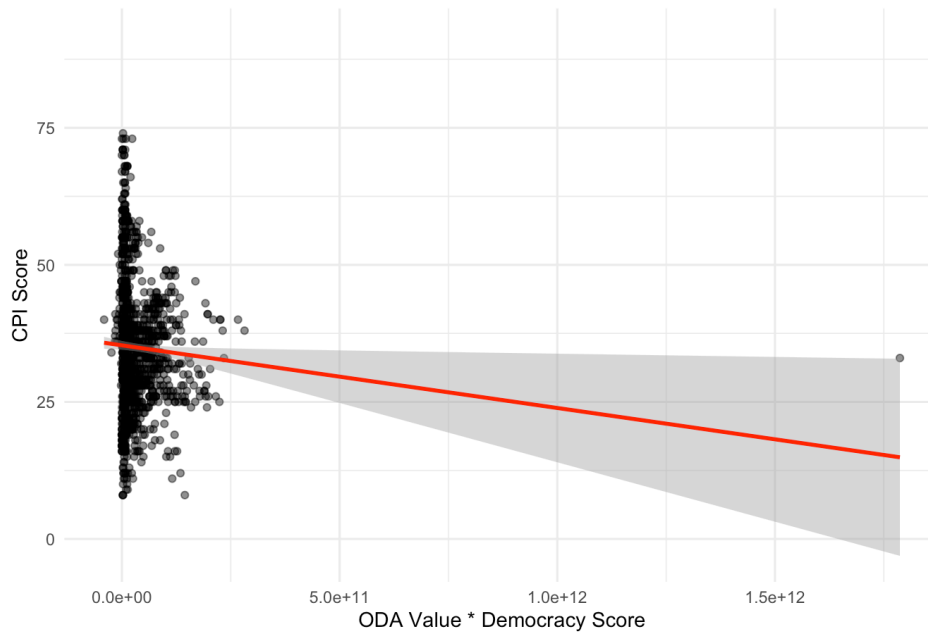
```

`geom\_smooth()` using formula = 'y ~ x'

Warning: Removed 16724 rows containing non-finite outside the scale range  
(`stat\_smooth()`).

Warning: Removed 16724 rows containing missing values or values outside the scale range  
(`geom\_point()`).

## Regression Analysis: CPI Score vs. ODA \* Democracy Score



## Specify the main regression model you will use to test your hypothesis

The regression equation is:

$$CPI\_Score = \beta_0 + \beta_1(ODA\_Value) + \beta_2(Democracy\_Score) + \beta_3(ODA\_Value \times Democracy\_Score) + \sum \beta_4(Country) + \beta_5(Year) + \epsilon$$

## Explanation:

- $\beta_0$ : Intercept (constant term)
- $\beta_1(ODA\_Value)$ : Coefficient for Official Development Assistance (ODA)
- $\beta_2(Democracy\_Score)$ : Coefficient for Democracy Score
- $\beta_3(ODA\_Value \times Democracy\_Score)$ : Interaction term capturing the combined effect of ODA and Democracy Score
- $\sum \beta_4(Country)$ : Country fixed effects (categorical variable)
- $\beta_5(Year)$ : Coefficient for year to account for time trends
- $\epsilon$ : Error term (unexplained variation)