Econometric Indicators and Their Influence on Democracy

An Econometric Analysis

Rowan Sandhu and Kayley Watson

Econ 211 Regression Analysis

Professor Tanya Byker

13 December 2024

Abstract

In this paper, we aim to expand on previous research studying the impact of income on democracy to include extra variables, such as GDP per capita, inflation, gini coefficient, and different metrics of violence within a country. One key question we seek to answer is whether economic strength impacts democracy scores when controlling for violence and conflict. Our goal is to apply econometric research methods to our compiled panel data and develop a series of regression models to explain the relationships between our regressors and regressand.

Our models, which include combinations of GDP per capita, inflation, gini inequality, violence and conflict variables, and both country and time fixed effects yielded mixed results. The naive regression is aligned with previous studies demonstrating that GDP per capita is positively correlated with democracy. However, in contrast, our complex model–incorporating all variables and fixed effects–produced a negative correlation between GDP per capita and democracy, indicating our naive model was positively biased.

Introduction

In 2024, a record 74 countries[1], encompassing nearly 49% of the world's population, held national elections, marking a significant year in global political developments. Among these nations were some of the most influential and geopolitically important countries, including the United States, India, Russia, Iran, the United Kingdom, Taiwan, South Korea, and the European Union[2]. These elections not only shaped the political landscapes of their respective countries but also held profound implications for global relations and economic stability. However, despite the magnitude of these elections, concerns about the legitimacy and transparency of some of these

[1] "The 2024 Global Elections Super-Cycle | International IDEA." n.d. Www.idea.int. International IDEA. https://www.idea.int/initiatives/the-2024-global-elections-supercycle.
[2] Ewe, Koh. 2023. "Elections around the World in 2024." TIME. December 28, 2023. https://time.com/6550920/world-elections-2024/.

electoral processes persist, with many questioning the fairness and credibility of elections in certain regions.

Amid this global political backdrop, the Economist Intelligence Unit (EIU) reported a troubling trend: the average global democracy score in 2024 fell to its lowest level since the index began in 2006[3]. This decline in democratic quality has raised important questions about the future trajectory of global governance and its implications for economic performance. As democracies face challenges such as rising populism, political polarization, and democratic backsliding, it becomes crucial to assess the relationship between these shifts in political systems and economic health indicators.

The relationship between political regimes and economic performance has long been a subject of academic inquiry. However, with the decline in democratic scores, there is a growing need to understand how various economic variables such as GDP per capita, inflation, and gini inequality may influence democracy scores. This paper aims to explore these relationships. Specifically, we will examine how shifts in economic performance across different countries are associated with changes in overall democracy score, which encompasses various democratic indicators, such as measures of political freedoms, government transparency, and the civil liberties of citizens.

The objective of this paper is to contribute to the literature on the intersection of democracy and economic development by providing a nuanced analysis of how economic variables influence democracy. As we witness a global decline in democratic standards, it is imperative to understand whether and how a country's economy could be tied to changes in its

[3] EIU. 2023. "Democracy Index 2023." Economist Intelligence Unit. 2023. https://www.eiu.com/n/campaigns/democracy-index-2023/.

democracy score. In doing so, we will explore the potential benefits and consequences of growth, stability, and inequality on a nation's freedom status.

Literature Review

Many studies have been conducted to explore whether or not there is correlation between democracy and income. "Democracy Does Cause Growth," an article penned by the 2024 nobel winners in economics, concludes that democracy is generally conducive to economic growth even when countries have lower income levels[4]. Their evidence suggests that the positive effects of democracy come through economic reforms, improved governance, and better provision of public goods like education and healthcare. However, there are complexities regarding how human capital and educational levels influence these outcomes. Future research could delve deeper into the specific institutional mechanisms behind these effects and explore more complex dynamics that could affect the relationship between democracy and economic development.

The first group of authors also worked on another paper years earlier that concludes democracy is generally conducive to economic growth, even for countries with lower income levels[5]. The evidence suggests that the positive effects of democracy come through economic reforms, improved governance, and better provision of public goods like education and healthcare. However, there are complexities regarding how human capital and educational levels influence these outcomes. Future research could delve deeper into the specific institutional mechanisms behind these effects and explore more complex dynamics that could affect the relationship between democracy and economic development.

---

[4] Acemoglu, Daron, Simon Johnson, James A Robinson, and Pierre Yared. 2008. "Income and Democracy." *American Economic Review* 98 (3): 808–42. https://doi.org/10.1257/aer.98.3.808.

[5] Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A. Robinson. 2019. "Democracy Does Cause Growth." Journal of Political Economy 127 (1): 47–100. https://doi.org/10.1086/700936.

The third paper challenges the widely accepted belief that higher income per capita directly causes democracy, arguing instead that historical factors, rather than income levels, shape the divergent political and economic development paths of societies[6]. While income and democracy are positively correlated, the authors find no evidence of a causal relationship between the two when using regressions with country fixed effects and instrumental variables. They suggest that the positive association arises because some countries have historically followed development paths that foster both democracy and economic growth, while others have pursued dictatorships and more limited economic development. The paper acknowledges that historical development paths create tendencies but emphasizes that political institutions are also shaped by other factors, such as economic crises, which can lead to the collapse of dictatorships and the rise of democracy. The authors argue that future research should focus on understanding how time-varying factors and human influences contribute to the evolution of political institutions and why some nations transition to democracy while others do not, suggesting that more work is needed to explore the complexities of these development trajectories.

The researchers examine the relationship between economic development and democracy in the Third World, focusing on the historical and material factors that influence democratic transitions. They argue that while higher levels of economic development generally improve prospects for democracy, it is not simply rising income that matters, but the broader changes in social and class structures, especially those brought about by industrialization and urbanization. They also emphasize the importance of the absence of large landholding classes and the presence of a strong agrarian middle class in fostering democratic prospects. However, the paper notes

[6] Huber, Evelyne, Dietrich Rueschemeyer, and John D Stephens. 1993. "The Impact of Economic Development on Democracy." Journal of Economic Perspectives 7 (3): 71–86. https://doi.org/10.1257/jep.7.3.71.

that current economic challenges, such as stagnation and debt, can hinder democratization by intensifying class conflict. While the end of the Cold War opens possibilities for a more pro-democratic foreign policy by developed nations, the researchers suggest that the prospects for democracy in the Third World remain uneven, with some countries better positioned than others. The study calls for further exploration of how economic factors, social structures, and external interventions interact to influence democratic outcomes.

The final paper we reviewed was authored by Vanessa Williamson of the Brookings Institution, offering a compelling exploration of the relationship between democracy and economic performance[7]. Williamson builds her argument by referencing a previous study titled Democracy Does Cause Growth by Acemogulu, Naidu, Restrepo, and Robinson, which establishes a strong correlation between democratic governance and robust economic outcomes. She then supplements these findings with real-world examples that illustrate the economic costs of limited democracy. One such example is modern-day Hungary under Prime Minister Viktor Orbán, whose administration has systematically curtailed human rights and democratic freedoms. Williamson highlights the significant economic repercussions of these policies, particularly the phenomenon of "brain drain". Hungary has experienced a troubling exodus of young, highly educated professionals. Williamson also turns to the historical context of the American South during the Jim Crow era to underscore her argument. Under the oppressive system of racial segregation, characterized by institutionalized racism, rampant White supremacy, and violence against Black communities—including events like the Tulsa Race Riots—the Southern economy stagnated. Unlike the industrializing North, which developed a thriving middle class and embraced modernization, the South remained economically backward, appealing primarily to

[7] Williamson, Vanessa. 2024. “Democracy Is Good for the Economy. Can Business Defend It?” Brookings. April 29, 2024. https://www.brookings.edu/articles/democracy-is-good-for-the-economy-can-business-defend-it/.

industries reliant on cheap, unskilled labor. It wasn't until after World War II, propelled by the Civil Rights Movement and the dismantling of segregation, that the South began to close the economic gap with the North. Through these examples, Williamson underscores a critical conclusion: a strong and inclusive democracy is not only a moral imperative but also a key driver of economic prosperity. She argues that businesses, as beneficiaries of stable and flourishing economies, have a vested interest in supporting democratic principles. By safeguarding democracy, nations can create environments conducive to innovation, talent retention, and long-term economic growth.

Through our project, we hope to expand on these previous studies and specifically study the causal effects of economic variables on democracy while controlling for conflict and violence. To expand on established projects we plan to add more specific economic variables to see if certain parts of the economy have more of an impact on others. We also want to make sure our data is biased as little as possible to ensure valid results, so we added a series of violence variables to our dataset. Furthermore, Williamson introduces the idea of strong economies and democracies being correlated together. Our study seeks to re-establish this fact while adding on in new ways.

Data

For our study, we use data from Freedom House, the World Bank, the United Nations, and the Armed Conflict Location and Event Data (ACLED). Freedom House provides measures of democracy, while the World Bank offers economic indicators to analyze the relationship between authoritarianism and economic outcomes. The United Nations data provides information on different countries' gini coefficients over time. ACLED supplies data on conflicts

to control for political instability's potential influence on democracy scores. Together, these datasets enable us to explore the interactions between democracy and economic performance while accounting for conflict within a country.

The Freedom House indicators are a method of quantifying freedom in a numerical way. The dataset ranks 195 countries and 15 territories based on how democratic they are by scoring countries on 25 different measures of freedom on a zero to four scale to give each country or territory a total out of 100. The score quantifies different aspects of democracy such as freedom of elections, freedom of speech, and freedom of expression and individuality. The Freedom House data has already been nicely formatted in an excel file, which includes the country names, the year, each individual measure of freedom and a total.

The World Bank provides datasets of various economic indicators split up by country. We combined this with the democracy data to measure how a country's authoritarianism affects GDP per capita, and inflation. The World Bank economic indicators are more difficult, since they are not all in the same dataset, and instead are separated into individual data sets with many values missing, and not at random. This means that values that are missing have significance, and we cannot use imputation methods to try to fill in the holes.

The data from the United Nations collects gini coefficients (a measure of wealth inequality) from 167 countries over time. Gini coefficients range from zero to 100 where zero stands for perfect wealth equality while 100 means that there is extreme wealth inequality. We plan to measure how our democracy score data from Freedom House changes when accounting for the inequality within a country's population .

To control for violence and conflict, we sourced Armed Conflict Location and Event Data (ACLED) that measures the number of conflicts that occur in each country over time. We totaled

all the different measures of conflict into five groups for each country and each year. This resulted in five categories: violence against individuals, direct arms conflict, explosive weapons, civil unrest, property and infrastructure damage, and others. We hope to use these different metrics to account for any omitted variable bias stemming from conflict within a country that could influence the democracy score.

The missing data as well as some other factors are aspects of sample selection bias we will have to deal with using econometric approaches. In our data set, there are a few clear examples of case 3 sample selection bias where data is missing based on Y or u. For example, there are several years where there is no World Bank Data on Eritrea, a country that has a low democracy score and a high level of violence. Since these data points are not missing at random, it is not possible to accurately impute values. As a result, countries like this will be removed from our final regression models altogether.

Econometric Models

$$Y_{Democracy\ Score} = \beta_0 + \beta_1 loggdpp_{it} + \beta_2 inflation_{it} + \beta_3 gini_{it} + \beta_4 viol\ agst\ indv_{it} +$$

$$\beta_5\ expl\ weap_{it} + \beta_6\ prop\ damage_{it} + \beta_7 civil\ unrest_{it} + \beta_8 other_{it} + \delta_i + \mu_{it}$$

The regression analysis explores the relationship between economic indicators and democracy scores using panel data from 103 countries over multiple years. The dependent variable is the democracy score, while the main independent variables of interest include GDP per capita, inflation, and the gini coefficient. Conflict-related variables, such as violence against individuals, direct armed conflict, and property destruction, are included as control variables to account for the potential impact of conflict on democracy. To ensure robust estimates, both country fixed effects and time fixed effects are incorporated, controlling for time-invariant country-specific

factors and global temporal shocks, respectively. In using our dataset to create our series of regressions, we assume there is no correlation between x and u, meaning the variables are exogenous and not correlated with the error term. Additionally, we are assuming panel data for entities is independent and identically distributed, meaning observations for the same country can be correlated over time, but different countries independent from each other. Lastly, we are avoiding multicollinearity and assuming that large outliers in our dataset are rare.

If these OLS assumptions are not met or violated in any way, it could distort relationships between variables, or lead to biased or inconsistent estimates. Violations like endogeneity, autocorrelation, multicollinearity and outliers can cause inaccurate coefficients, misleading significance tests, and could result in suboptimal policy conclusions. By using methods like clustered errors, avoiding multicollinearity and checking that outliers are rare, we are better able to claim the reliability of our results by doing the most to eliminate instances of OLS assumption violations

Model Interpretation

The results show that GDP per capita is positively associated with democracy scores in simpler models, but this relationship becomes statistically insignificant in the fully specified model (Table 2, column 8), where both country and time fixed effects are included. This suggests that much of the variation attributed to GDP per capita may be explained by unobserved factors captured by the fixed effects. The gini coefficient is consistently insignificant across all models, indicating that inequality does not have a measurable impact on democracy scores within this dataset. Inflation similarly shows no significant effect on democracy scores. Additionally, all of the violence indicators with the exception of the “other” unspecified category were extremely

significant, with most being significant at the one percent level while property damage was significant at the 5% level. Violence against individuals, explosive weaponry, and property damage were all associated with lower democracy scores, while civil unrest and direct arms conflict were not.

In the regressions with country fixed effects, the coefficient on log GDP per capita turns negative, seemingly indicating that log gdp per capita decreases democracy score when accounting for things that vary between countries but are constant over time. Furthermore, the regression with all our economic indicators, violence variables, and country and time fixed effects and our model with just the country fixed effect, the negative coefficient on log GDP per capita was significant at the 5% level, which indicates that our predictions for our naive model were positively biased.

One remaining area of omitted variable bias in our regressions could be caused by missing data values in countries that face more violence and conflict. Since war-torn countries are less likely to have available economic data, we will have less observations for less democratic countries, and this could skew our results. Unfortunately, we cannot do much else to solve this issue at the moment except to include our violence control variables to try to eliminate as much OVB as possible.

Hypothesis Testing

In table two, we ran hypothesis tests on time fixed effects as well as the conflict coefficients. The purpose of these hypothesis tests was to see if time fixed effects or the conflict coefficients significantly influence a country's democracy score. We set this up by establishing that the null hypothesis that time fixed effects will have no influence on a country's democracy

score (H_0: $\delta_i = 0$). We then define the alternative that time fixed effects do significantly influence a country's democracy score (H_A: $\delta_i \neq 0$). We repeat this process for the conflict coefficients where the null is that there is no correlation between conflict and democracy score (H_0: $\square_4 = \square_5 = \square_6 = \square_7 = \square_8 = 0$) and the alternative hypothesis that there is correlation (H_A: At least one $\square_i \neq 0$). Looking at the output table we can see that all our hypothesis tests P-Values are statistically significant at the 1% level of significance, providing strong evidence that both time fixed effects and the conflict coefficient are important factors influencing a country's democracy score.

Omitted Variable Bias

By using panel data, we are able to observe how variables change overtime while controlling for certain types of omitted variable bias, OVB, in variables that vary across entities but not over time (country fixed) and variables that vary across time but not entities (time fixed). Additionally, we assumed from the beginning that countries with more violence would be less democratic and less economically healthy. Because this is a possible source of OVB, we choose to include the ACLED variables that accounted for violence and conflict within countries. This theory of conflicted countries being less democratic also impacts our original dataset, since there was a strong correlation between missing economic indicator observations with war-torn countries, such as Eritreia, where there were no observations for several years.

Conclusion

Overall, our findings suggest that country fixed effects significantly influence the relationship between GDP per capita and democracy, as only the regressions with entity fixed effects produce large negative coefficients for GDP per capita. Moving forward, future research should investigate why country fixed effects have such a substantial impact on this relationship. Exploring this further could yield valuable insights for policy makers who would be better

informed by more robust datasets and regressions that can account for unknown omitted variables and address issues that arise from missing data in war-torn countries.

In conclusion, our first regression is concurrent with the findings of Acemoglu et al., as our naive regression indicates that log GDP per capita is positively correlated with democracy and significant at the five percent level. In contrast, our final regression reveals country fixed effects are contributing to a negative correlation between GDP per capita and democracy. As a result, if we wanted to use these findings to inform policy, it would be beneficial to perform further analysis to try and pinpoint what specifically is causing the GDP per capita coefficient to be so different in the complex regression with entity fixed effects. Additionally, our results may be influenced by the missing data in countries that are less developed and affected violence and conflict. This could skew our dataset and results in favor of more developed, wealthier countries that tend to be more democratic. Our findings point to potential pathways for future research that could help identify the strongest economic predictors and indicators of democracy. Ultimately, robust studies in the causal factors of democracy could provide a foundation for policy initiatives aimed towards promoting democracy worldwide.

Bibliography

Acemoglu, Daron, Simon Johnson, James A Robinson, and Pierre Yared. 2008. “Income and Democracy.” *American Economic Review* 98 (3): 808–42. https://doi.org/10.1257/aer.98.3.808.

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A. Robinson. 2019. “Democracy Does Cause Growth.” *Journal of Political Economy* 127 (1): 47–100. https://doi.org/10.1086/700936.

ACLED. 2024. Data & Tools. ACLED. https://acleddata.com/data/.

Development on Democracy.” *Journal of Economic Perspectives* 7 (3): 71–86. https://doi.org/10.1257/jep.7.3.71.

Ewe, Koh. 2023. “Elections around the World in 2024.” TIME. December 28, 2023. https://time.com/6550920/world-elections-2024/.

EIU. 2023. “Democracy Index 2023.” Economist Intelligence Unit. 2023. https://www.eiu.com/n/campaigns/democracy-index-2023/.

Huber, Evelyne, Dietrich Rueschemeyer, and John D Stephens. 1993. “The Impact of Economic

“The 2024 Global Elections Super-Cycle | International IDEA.” n.d. www.idea.int. International IDEA. https://www.idea.int/initiatives/the-2024-global-elections-supercycle.

Williamson, Vanessa. 2024. “Democracy Is Good for the Economy. Can Business Defend It?” Brookings. April 29, 2024. https://www.brookings.edu/articles/democracy-is-good-for-the-economy-can-business-defend-it/.

Freedom House. 2024. *Freedom in the World*. Freedom House. https://freedomhouse.org/report/freedom-world.

UN Data. 2023. *Gini Index*. UN Data. https://data.un.org/Data.aspx?d=WDI&f=Indicator_Code%3ASI.POV.GINI.

World Bank. 2024. *GDP per Capita (Current US$)*. World Bank. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?view=chart.

World Bank. 2024. *Inflation, Consumer Prices (Annual %)*. World Bank. https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?view=chart.

World Bank. 2024. *Population, Total*. World Bank.
https://data.worldbank.org/indicator/SP.POP.TOTL?view=chart.

Plots and Tables

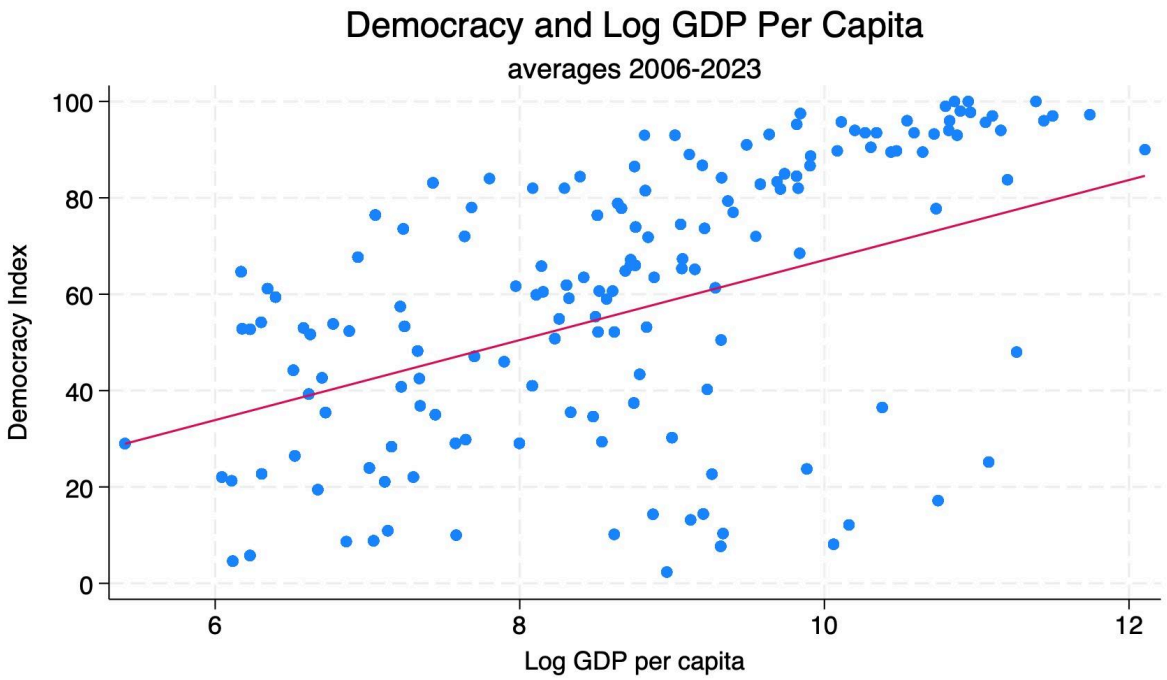

Figure 1
Scatter plot and trend line of average democracy score and average GDP per capita from 2006 to 2023
Source: Worldbank, UN, ACLED, Freedom House

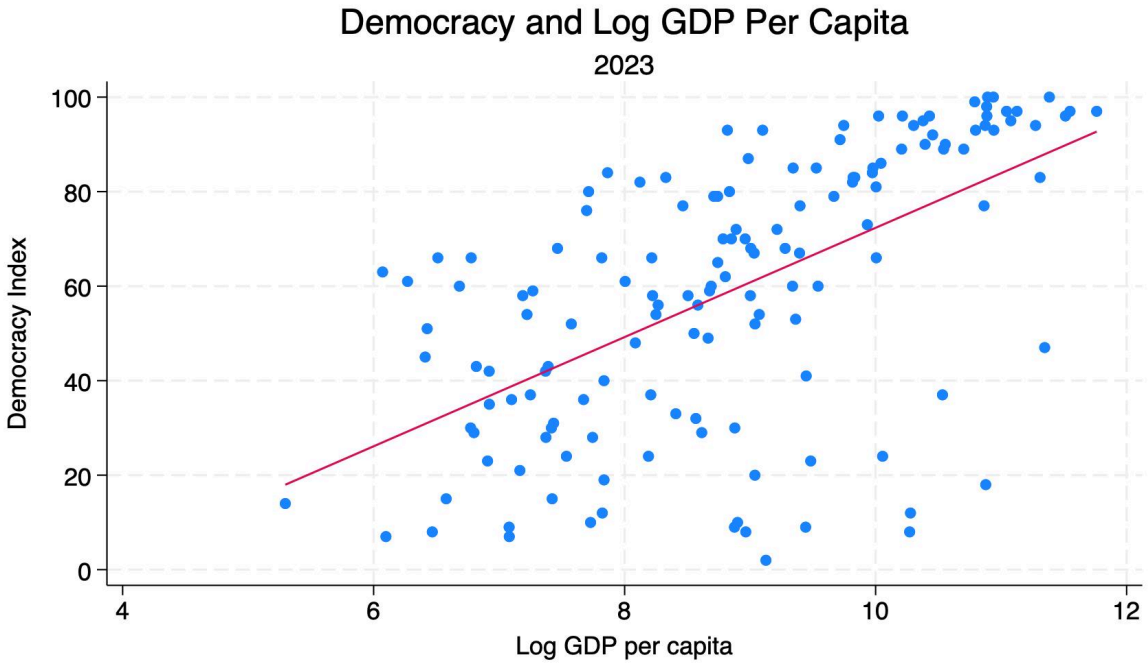

Figure 2
Scatter plot and trend line of democracy score and GDP per capita for the year 2023
Source: Worldbank, UN, ACLED, Freedom House

Variable	Mean	Std. dev.	Min	Max
GDP (Tens of Millions)	$6,061.67	$24,908.64	$9.40	$235,940.00
Inflation	6.8%	2.8%	-1.2%	380.0%
Gini Coefficient	39	8	24	63
GDP per Capita	$8,896.54	$14,319.90	$166.28	$116,905.40
Log of GDP per Capita	8.28	1.30	5.11	11.67
Democracy Score	60.30	22.38	7.00	100.00
Population (Hundreds of Thousands)	883.2	2532.0	5.2	14111.0
Violence Against Individuals	23.00	57.30	0.00	490.00
Direct Arms Conflict	425.20	1380.31	0.00	9315.00
Explosive Weapons	112.08	620.64	0.00	6900.00
Civil Unrest	186.56	551.19	0.00	5220.00
Property/Infrastructure Damage	24.29	67.65	0.00	482.00
Other Forms of Conflict	8.30	39.45	0.00	445.00

Table 1
Summary statistics of all variables in the full dataset
Source: Worldbank, UN, ACLED, Freedom House

Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log GDP per Capita	9.786***	9.487***	10.18***	10.36***	-10.04**	9.475***	-11.88***	-12.45**
	(0.855)	(0.868)	(0.855)	(0.858)	(3.911)	(1.349)	(4.455)	(4.753)
Inflation		-0.0883***						0.0319**
		(0.0277)						(0.0145)
Gini			0.413***					0.128
			(0.124)					(0.343)
Violence Against Individuals				-0.116***				0.0123
				(0.0207)				(0.0164)
Explosive Weapons				-0.00470***				0.00249
				(0.00135)				(0.00270)
Property Damaged				-0.0569**				0.0346
				(0.0267)				(0.0447)
Civil Unrest				0.00745***				0.00147
				(0.00101)				(0.00133)
Direct Arms Conflict				0.00452***				-0.00150*
				(0.00115)				(0.000834)
Other Forms of Conflict				-0.00833				-0.0633**
				(0.0137)				(0.0300)
Years	2007-2022	2007-2022	2007-2022	2007-2022	2007-2022	2007-2022	2007-2022	2007-2022
Country Fixed Effects	No	No	No	No	Yes	No	Yes	Yes
Time Fixed Effects	No	No	No	No	No	Yes	Yes	Yes
Constant	47.09***	47.75***	30.46***	47.60***	74.20***	53.40***	74.49***	68.76***
	(1.590)	(1.617)	(5.348)	(1.648)	(5.350)	(8.361)	(9.320)	(18.90)
P-Value of Test of Joint Hypothesis								
Time Fixed Effects = 0						45.04	2.86	3.4
						(0.0001)	(0.0007)	(0.0001)
Conflict Coefficients = 0				17.04				4.57
				(0.0000)				(0.0004)
R-squared	0.328	0.327	0.348	0.453	0.064		0.199	0.233
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1								

Table 2
Table of regression outputs for 8 regressions run on the full dataset
Source: Worldbank, UN, ACLED, Freedom House

Member Contributions

Kayley cleaned and merged the datasets in RStudio and shared them with Rowan for coding in Stata. Rowan created the regressions and tables for the report and Kayley generated the plots. We both worked on the interim assignments like the proposal, data download, and annotated bibliography and used these assignments to create this final report.

Honor Code and AI Statement

I have neither given nor received any unauthorized aid on this assignment. No AI or work from former students was used.

Rowan Sandhu and Kayley Watson