**SODA496: Final Project Paper**

**Study on the government fragility and the mortality by death penalty**

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GitHub repository: <https://github.com/khyewon/SODA496>

**Introduction**

The research examines the relationship between government fragility and the mortality by the death penalty statement derived from the broad research question of “how does the government type influence on the mortality by death penalty statement.” The study argues that government fragility leads to higher mortality to the death penalty statement. Additionally, the study considers the relationship regarding the impact of literacy rates and the level of autocracy for further exploration and the outer factors’ influence. The results are expected to help understand how different types of government influence attitudes towards the death penalty and, therefore, provide valuable insights into how to promote justice and human rights worldwide for the extensive arguments on the necessity of the death penalty.

**Literature Review**

Beber and Acarcco investigated the relationship between regime type and the use of the death penalty previously. They argued that different types of regimes have distinct motivations for using the death penalty and that these motivations may explain variations in its use. The research resulted that the use of the death penalty is highest in autocratic regimes and lowest in democratic regimes. They finalized that authoritarian regimes use the death penalty primarily as a tool of repression to maintain their hold on power. In contrast, the death penalty in democratic regimes is the last punishment when there is no other enough statement.

Another previous study by Wojciechowski examined the relationship between government type, democratic experience, and public support for the death penalty. The main argument in the study is that the level of public support for the death penalty is influenced by the type of government and the degree of democratic experience in a country. Wojciechowski categorized countries into three types of government, which are democratic, authoritarian, and hybrid, based on the length of time a country has been democratic. At last, the results showed that public support for the death penalty is highest in authoritarian governments, followed by hybrid countries, and lowest in democratic countries. In addition, the longer a country has been democratic, the lower the level of support for the death penalty. Wojciechowski suggested that these findings may be explained by the fact that authoritarian regimes use the death penalty as a tool of control which Beber and Acarcco suggested and that the public in these countries may view it as necessary for maintaining order.

However, these two works of literature are limited to the use of cross-sectional data, which may not accurately capture changes in public attitudes over time. Moreover, Beber and Acarcco’s study used data between 1946 and 2005, almost 20 years ago. In this research, the data from 2007 to 2022 will be used, and it is possible to update the findings observing recent trends in death penalty execution.

**Hypothesis**

H1. Government anarchy leads to higher mortality by death penalty statement.

H1-1.Government anarchy leads to higher mortality by death penalty statement if there is a higher literacy rate.

H1-2. More fragile autocracy increases the mortality by death penalty statement if there is a higher literacy rate.

**Data Analysis**

The study's dependent variable is the number of actual executions by death penalty statement. The independent variables are the fragile state index, literacy rate percentage of people aged 15 and above, and democracy index by the electoral system.

The actual execution data are collected by the Cornell Center on the Death Penalty Worldwide from 80 countries from 2007 to 2022. This data tracks the laws and practices of capital punishment in countries. Still, because some states classify the death penalty as state secrets or only provide selective data, the reliability of the dataset is limited. The data pre-processing step classified the dataset into four categories of high, medium, low, and no execution to reduce this limitation and removed values greater than 1000 as outliers. No execution means there is no execution ever during the targeted years. Then, the Low category includes countries equal to or lower than 37, which is the first quantile of the dataset. The Medium contains the countries having values of execution between 37 and 60.57, the mean of the execution numbers. Finally, the High category consisted of values over 60.57. The categorized execution has the highest numbers in the No Execution category, while there are the lowest numbers in medium execution countries, as shown in Figure 1 below. These categories were weighted in 0 to 3 scales, where 0 represents no execution and three values the high numbers of execution.

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**Figure 1.** numbers of classified death penalty execution category

The fragile state index for the independent variable was collected by the Fragile State Index powered by The Fund for Peace (FFP) from 179 countries from 2006 to 2022. Its high score means less regime stability. For example, Yemen and Somalia have 111.7 and 110.5 index rates each in 2022, which indicates they have the most unstable government regime, while Finland and Norway have 15.1 and 15.6 indexes in 2022, which means that both countries have highly stable government regimes. Most regimes are concentrated around a mean value of 69.52, as shown in Figure 2.

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**Figure 2.** Density Plot for Fragile State Index

Literacy rate as a percentage of people aged 15 and above data for another independent variable is from the World Bank Data Indicator (WDI), initially collected by the UNESCO Institution for Statistics (UIS). The rate evaluates the educational attainment of adults who can both read and write with an understanding of a short, simple statement in their everyday life. The dataset has 266 countries’ values from 2007 to 2021. Therefore, while testing hypotheses 1-1, 2022 is removed from the final data. The density Plot for Literacy Rate (Figure 3) shows that overall values have a left-skewed density graph with the highest density at around 100. However, there are many NA values in the data, meaning only 204 values are available. These NA values may threaten the generalization of the result in the future.

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**Figure 3.** Density Plot for Literacy Rate

The democracy index from Our World Data, which evaluates countries in terms of democracies and autocracies worldwide, is used to test hypotheses 1-2, joined with the fragile state index. The data has values from 186 countries across the year between 2007 to 2022. The values mean, and median is both at 0.523, which indicates most countries have moderate electoral system rates and democracy indexes. The index, however, relies solely on the electoral system to evaluate whether the country is democratic or not. Therefore, it may result in reliability errors, indicating that some countries, such as North Korea, have an electoral system but are still not democratic.

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**Figure 4.** Density Plot for Democracy Index by electoral system

**Modeling and Future Works**

The linear regression model to test the coefficient between the numbers of execution by death penalty statement and the fragile state index showed a negative relationship of -0.0016 percentage points, which means more unstable countries tend to have less execution by death penalty statements. However, the result is not statistically significant since its p-value is greater than 0.05.

In future works, the study should increase its data validity of the democracy index, finding other datasets to evaluate the democracy index more accurately. In addition, the numbers of executions can be categorized into different groups to be more normally distributed. Test the linear regression for the sub-hypothesis with an improved dataset and try another regression model to infer the relationship. The predictive model can be used at last with any statistically significant results while splitting data into train and test data.

**Bibliography**

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