



# Impact of Democracy on Vaccination

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# Problem Statement

This analysis quantifies the relationship, if any, of governmental control of its people and the vaccination rate of the country.

Governmental  
Control

Vaccination  
Rate



# Data Preparation

Two sources of data about the international community: vaccination rates and democracy index.

## Data Sources

- Johns Hopkins Coronavirus Resource Center  
<https://coronavirus.jhu.edu/vaccines/us-states>
- University of Würzburg  
<http://www.democracymatrix.com/>

## Data Preprocessing

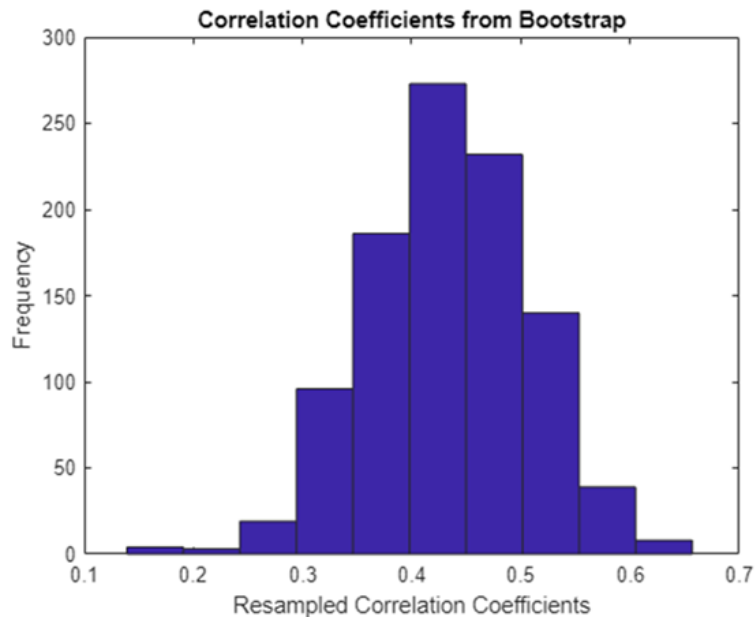
- Clean data in SAS → 152 countries

## Descriptive Statistics

Classification	Group Count	Percentage Fully Vaccinated	Total Value Index
Working Democracy	31	0.7426 (0.0969)	0.8916 (0.0415)
Deficient Democracy	44	0.4825 (0.2298)	0.6755 (0.0749)
Hybrid Regime	33	0.3790 (0.2535)	0.4872 (0.0631)
Moderate Autocracy	29	0.3640 (0.2602)	0.2875 (0.0785)
Hard Autocracy	15	0.3943 (0.3391)	0.0914 (0.0373)

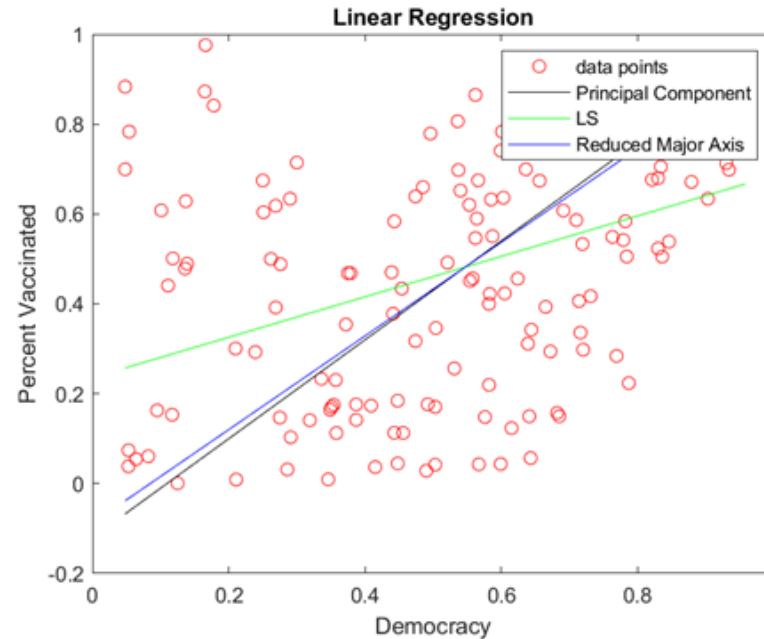
# Hypothesis I

Null hypothesis: Democracy levels and vaccination rates have a positive correlation.

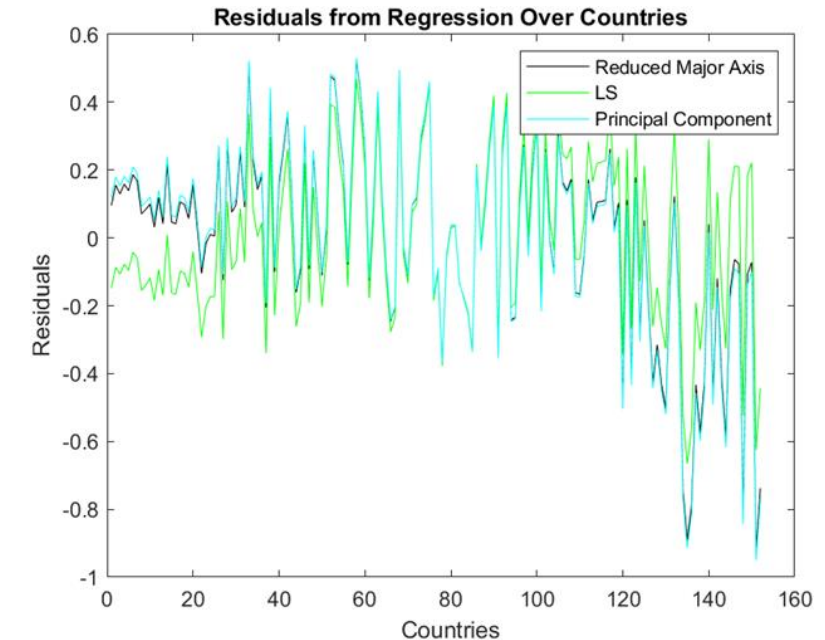


[0.277, 0.5879]

Correlation Coefficient: 0.43  
[0.2926, 0.5529]



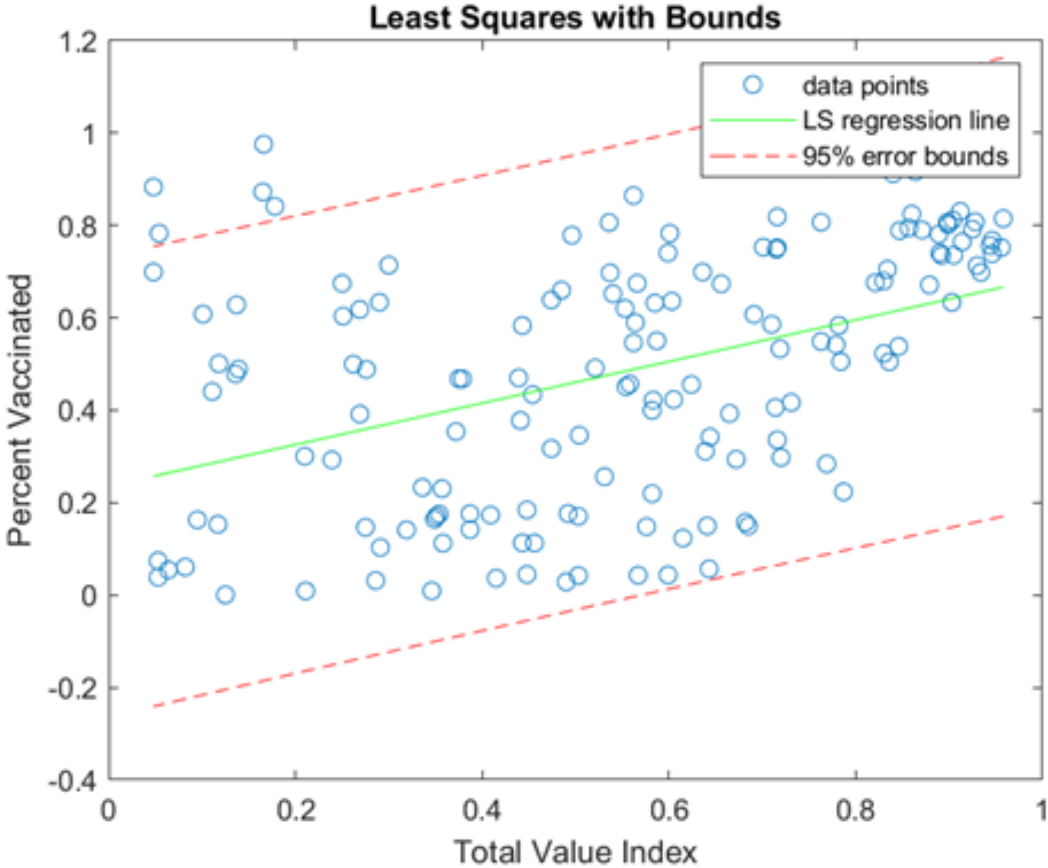
$$\begin{aligned}\text{LS: } y &= 0.4499x + 0.2356 \\ \text{RMA: } y &= 1.0423x - 0.0884 \\ \text{PCA: } y &= 1.1007x - 0.1203\end{aligned}$$



$$\begin{aligned}\text{error\_LS} &= 0.2436 \\ \text{error\_RMA} &= 0.2880 \\ \text{error\_PCA} &= 0.2963\end{aligned}$$

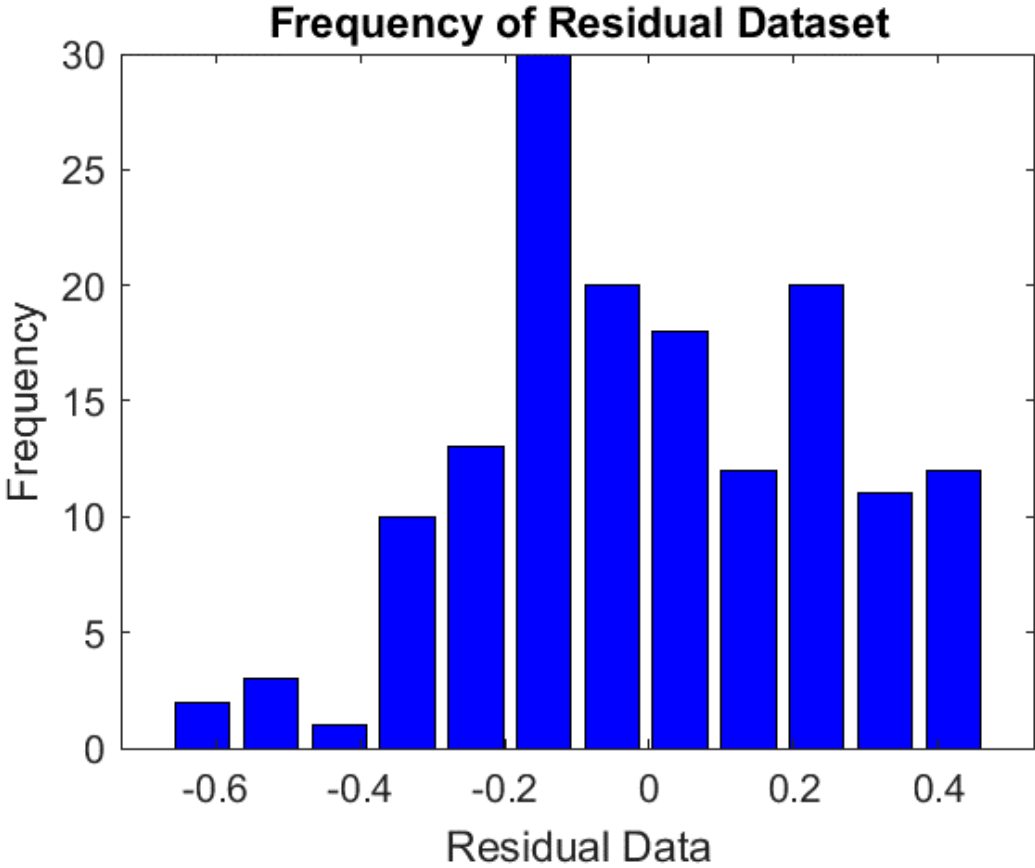
# Least Squares Results

## Least Squares Regression Line



## Frequency of Residuals

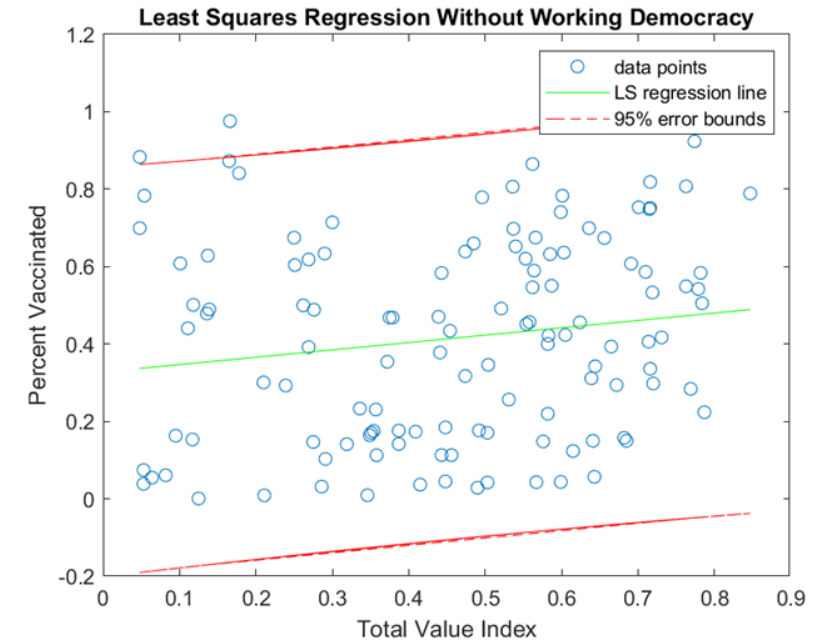
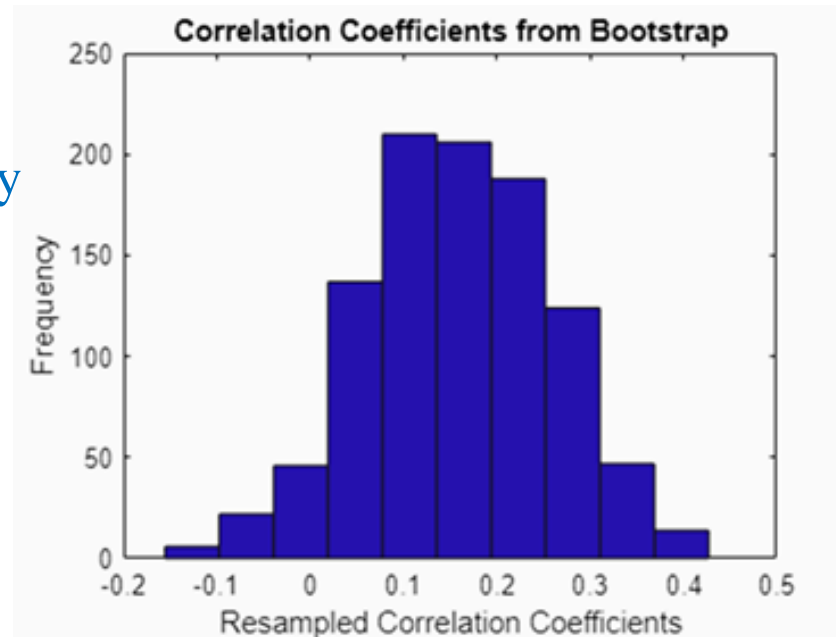
$\chi^2$ : 24.355, 16.919



# Hypothesis II

Null hypothesis: The correlation is not due to Working Democracy only.

correlation coefficient of  
0.1566,  $[-0.0225, 0.3260]$



The line of best fit:

$[-0.0252, 0.3494]$ .

$$Y = 0.1903x + 0.3277$$

# Discussion

- Limitations
  - Model is too simple to accurately or sufficiently determine the factors of the relationship, if any
  - Schwarzinger et al. (2021) find that younger generations are less hesitant towards the vaccine, despite being the ones that will least likely be affected by the virus
  - Abuza (2020) finds that political regimes are not the influencers of biological threat response - leadership is.
  - Multivariable regression??
- Fail to reject null hypothesis I: there is a relationship between democracy level and vaccination rates
- Reject null hypothesis II: without Working Democracy data, there is little to no correlation between the remaining countries
- Saudi Arabia, China, other autocratic countries have high vaccination rates
  - Coccia (2021) - direct democracies have higher mean vaccination rates, parliamentary monarchy has the second highest average, and monarchy has the third highest.



*Thank  
you*

