

# A study of Democracy Backsliding in the Perspective of COVID-19 using econometrics and machine learning approaches

Jacek Lewkowicz PhD\*, Michał Woźniak\*\* and Michał Wrzesiński

Faculty of Economic Sciences, University of Warsaw

\*jlewkowicz@wne.uw.edu.pl \*\*mj.wozniak9@student.uw.edu.pl



## 1. Introduction

World governments are using the global COVID-19 pandemic to pursue their opportunistic goals, corruption and power strengthening. This issue poses a serious threat to the stability of democracy [1][2]. The goal of the research is to investigate the consequences of the COVID-19 pandemic for the quality of democracy, depending on institutional circumstances in a country. Therefore we state the question: **What is the relevance of the law and the current state of democracy for susceptibility to democracy backsliding in the face of the COVID-19?** We use a novel global dataset [3] covering the period of the first wave of the pandemic and apply various econometric and machine learning tools to analyse our research problem.

## 2. Literature review

Studies on democratization [4] suggest the following determinants of the democracy distortion [direction of the impact]:

- Rule of law [-]
- Current state of democracy [-]
- Economic development and economic stability [-]
- Education level [-]
- Trade flow and policy [-]
- Natural resources [+]
- Linguistic, religious and ethnical fractionalization [+/-]
- Economic inequality [+]
- Population density [+]

## 3. Materials

Data specification: cross-sectional

Geographic scope: 146 countries

Variables (type, time, source):

- **Pandemic data** (endogenous, 03-07.2020, V-Dem Institute):  
Pandemic Democratic Violations and Disinformation Index (pandem\_dis), Pandemic Backsliding Index (panback)
- **Democratization data** (exogenous, 2019, V-Dem Institute):  
Rule of law index (rule), Electoral democracy index (polyarchy), Education level index (education), Politico-geographic regions dummy (region\_geo)
- **Economic & Demographic data** (exogenous, 2019, WB & OECD):  
Gini Index (gini), GDP pc (gdp\_pc), Trade GDP (trade\_gdp), Inflation rate (inflation), Oil sale (oil), Minerals sale (mineral), Population Density (density), Income group dummy (income\_group)
- **Fractionalization data** (exogenous, 2018, Alesina Fractionalization Dataset):  
Ethnic (ethnic\_frac), Linguistic (ling\_frac) and Religious fractionalization (relig\_frac)

## 6. Conclusions

Our results suggest that **the rule of law and high level of the initial state of democracy may prevent from democracy backsliding during extraordinary negative shocks**. As a result we provide a value-added to the strand of literature on the outcome of the COVID-19 and determinants of democracy and democratization.

## 7. References

<https://tinyurl.com/2020mlinpl>

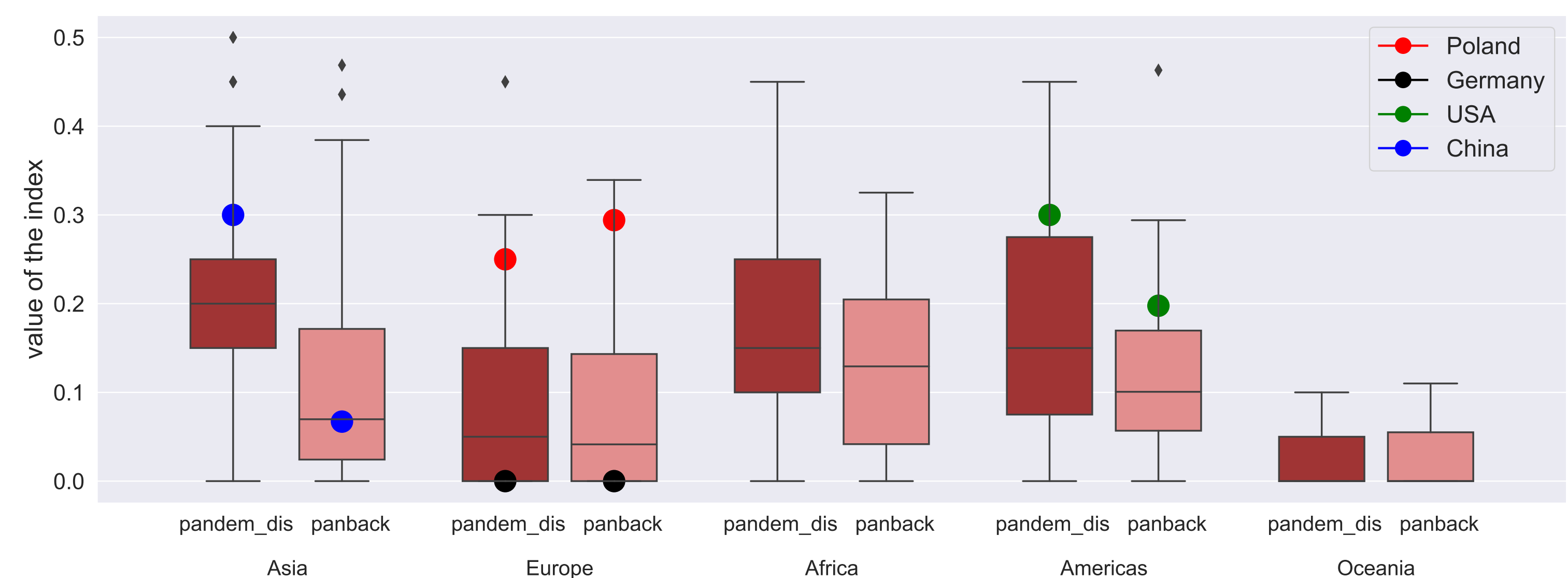
## 4. Methods & brief EDA

**General formula:**  $democracy\_backsliding_i = \alpha + \beta_0 * rule_i + \beta_1 * polyarchy_i + \gamma * X_i + \epsilon$

**Models:**

- Ordinary Least Squares (OLS) Regression – baseline modeling approach
- Two-Stage Least Squares (2SLS) Regression – to handle interrelationships between variables
- CatBoost – to handle highly non-linear interactions between variables (also categorical ones)

**Brief EDA:**



## 5. Results

**Econometric models:**

| Variables<br>(only the most significant are included) | OLS Models<br>(with robust cov matrix) |           |                       |           |                       |           | 2SLS Models |          |
|---|--|-----------|-----------------------|-----------|-----------------------|-----------|-------------|----------|
|   | (1)                                    | (2)       | (3)                   | (4)       | (5)                   | (6)       | (1)         | (2)      |
| panback   |  |           |                       |           |                       |           |             |          |
| pandem_dis  |  |           |                       |           |                       |           |             |          |
| polyarchy   | 0.091                                  | -0.216**  | variable not included | 0.145**   | -0.194***             | -0.033    | -0.272***   |          |
| rule  | 0.067                                  | 0.027     | 0.119**               | -0.097*   | variable not included |           |             |          |
| trade_gdp_log   | -0.045*                                | -0.068*** | -0.043*               | -0.071*** | -0.044*               | -0.067*** |             |          |
| mineral   | 0.004                                  | 0.006**   | 0.004                 | 0.006*    | 0.003                 | 0.006**   |             |          |
| region_geo FE   | yes                                    | yes       | yes                   | yes       | yes                   | yes       |             |          |
| income_group FE                                       | yes                                    | yes       | yes                   | yes       | yes                   | yes       |             |          |
| Constant  | -0.136                                 | 0.047     | -0.066                | -0.114    | -0.170                | 0.033     | 0.132***    | 0.307*** |
| Adjusted R <sup>2</sup>                               | 0.218                                  | 0.313     | 0.216                 | 0.281     | 0.218                 | 0.318     | -0.008      | 0.271    |

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01; '+' positive impact, '-' negative impact, '0' no impact

**Machine Learning models:**

