Governor's Party, Policies, and COVID-19 Outcomes: Further Evidence of an Effect

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Abstract:

Introduction: This study connects the aggregate strength of public health policies taken in response to the COVID-19 pandemic in the U.S. states to the governors' party affiliations and to the state-level outcomes. Understanding the relationship between politics and public health measures can better prepare our communities for what to expect from their governments in a future crisis and encourage advocacy for delegating public health decisions to medical professionals.

Methods: The Public Health Protective Policy Index (PPI) captures the strength of policy response to COVID-19 at the state level. We estimate a Bayesian model that links the rate of disease spread to PPI. The model also accounts for the possible state-specific undercounting of cases and controls for state population density, poverty, number of physicians, cardiovascular disease, asthma, smoking, obesity, age, racial composition, and urbanization. We employ a Bayesian linear model with natural splines of time to link the dynamics of PPI to governors' party affiliations.

Results: A 10-percentage-point decrease in PPI is associated with an 8-percent increase in the expected number of new cases. Between late March and November 2020 and at the state-specific peaks of the pandemic, the PPI in the states with Democratic governors was about 10 percentage points higher than in the states with Republican governors.

Conclusions: Public health measures were stricter in the Democrat-led states, and stricter public health measures were associated with a slower growth of COVID-19 cases. The apparent politization of public health measures suggests that public health decision-making by health professionals rather than political incumbents could be beneficial.

Introduction

In a recent AJPM research brief, Neelon and colleagues[1] demonstrate a correlation between the partisanship of a governor in US states and the morbidity and mortality during the COVID-19 epidemic. They also conjecture that "the political affiliation of state leaders and specifically governors might best capture the omnibus impact of state policies." [1] While studies to-date show impact of individual types of mitigation policies[2,3,4] on health outcomes, they do not speak to their combined effect nor do they look specifically into the US states.

The present study uses the Public Health Protective Policy Index (PPI)[5,6] to connect the aggregate strength (stringency) of state-originating public health policies to both the party affiliation of its governor and to the state-level outcomes. Understanding the relationship between politics and public health measures can better prepare American communities for what to expect from their governments in a future crisis and encourage the medical community to advocate for greater delegation of public health policy-making to professional actors.

Methods

The Public Health Protective Policy Index (PPI) is an aggregated measure of public health policy stringency, calculated for each day in each state based on 15 categories of public health measures (see Appendix). For each observation, three indices are calculated. National PPI aggregates measures adopted by the federal government, according to the stringency in each of the categories. State PPI aggregates measures adopted by the state government. Finally, Total PPI aggregates the highest values from each of the 15 categories when comparing the federal and state-originating policies. [5,6] While normal policymaking includes multiple political and societal actors, this attribution of policy stringency to governors is justified because over 88% of all COVID-19 policies in the US states came directly through executive actions rather than from the legislature, bureaucracy, or judiciary.

Estimations use the Total PPI thus combining state-originated policies with federal-originated policies.. Unlike State PPI, Total PPI does not penalize governors for failing to enact policies that would be redundant to federal policies. While many states duplicated or exceeded federal actions in specific categories, others did not issue their own versions of otherwise available policies.[5] The analysis, following Neelon and colleagues, [1] covers mitigation policies between March 1 and November 30, 2020.

The analysis of the link between governors' party affiliations and the dynamics of new COVID-19 cases is broken into two steps: (1) a study of the link between the policy stringency and the dynamics of new COVID-19 cases, and (2) a study of the link between the policy stringency and governors' party affiliations. The first step employs a Bayesian model that follows the logic of the "Susceptible-Infected-Removed" (SIR) model.[7] In it the expected number of newly infected is proportional to the number of the infectious and the share of the susceptible in the population:

$$\mathrm{E}\left[\mathrm{I}_{\mathrm{j},(\mathrm{t}+1)}^{\mathrm{new}}\right] = \lambda_{\mathrm{j,t}} s_{j,t} I_{j,t},$$

where $\mathrm{I}_{\mathrm{j,(t+1)}}^{\mathrm{new}}$ is the number of new infections in state j in period (t+1), $I_{j,t}$ is the estimated number of currently infectious, $s_{j,t}$ is the share of those susceptible, and $\lambda_{\mathrm{j,t}}$ is a coefficient incorporating the density of contacts and transmissibility of the infection. $\mathrm{I}_{\mathrm{j,(t+1)}}^{\mathrm{new}}$, $I_{j,t}$, and $s_{j,t}$ are constructed using the state-wide counts of new cases[8] and additional parameters for the state-specific rates of potential undercounting of new cases and the rate of removal of the infectious. ln $(\lambda_{j,t})$ depends linearly on the stringency of current policies:

$$\ln(\lambda_{j,t}) = \beta_0 + P_{j,(t-3)}\beta_1 + X_j\alpha,$$

where $P_{j,(t-3)}$ is the value of total PPI with a 3-day lag, and X_j are state-specific control variables. In the appendix, 7- and 14-day lags are used in robustness checks. The number of new cases is assumed to follow a negative binomial distribution. The posterior samples for the model parameters are drawn using weakly informative priors and Gibbs sampler.[9,10] Model details, including the model specification, parameter estimates, the list of control variables, the covariates of the undercounting of new cases, and the data sources, are provided in the Appendix.

To examine the association between the party affiliation of the governor and policy stringency, a Bayesian linear model is estimated, which treats the average PPI as a function of time and governor's party affiliation. It uses natural cubic splines of time and a separate set of coefficients for each state in the analysis. State-specific coefficients have multivariate normal priors with different hyperpriors for the states with Democratic and Republican governors. Gibbs sampler[9,10] is employed to compute the posterior distribution of state-specific trajectories and the average trajectories of policy stringency in the states with Democratic and Republican governors.

Results

According to the estimates of the first model, the posterior mean of β_1 is -0.839, with the central 95% posterior interval between -0.806 and -0.630. Thus a 10-percentage-point decrease in the policy stringency is associated in the model with an 8-percent increase in the expected number of new cases.

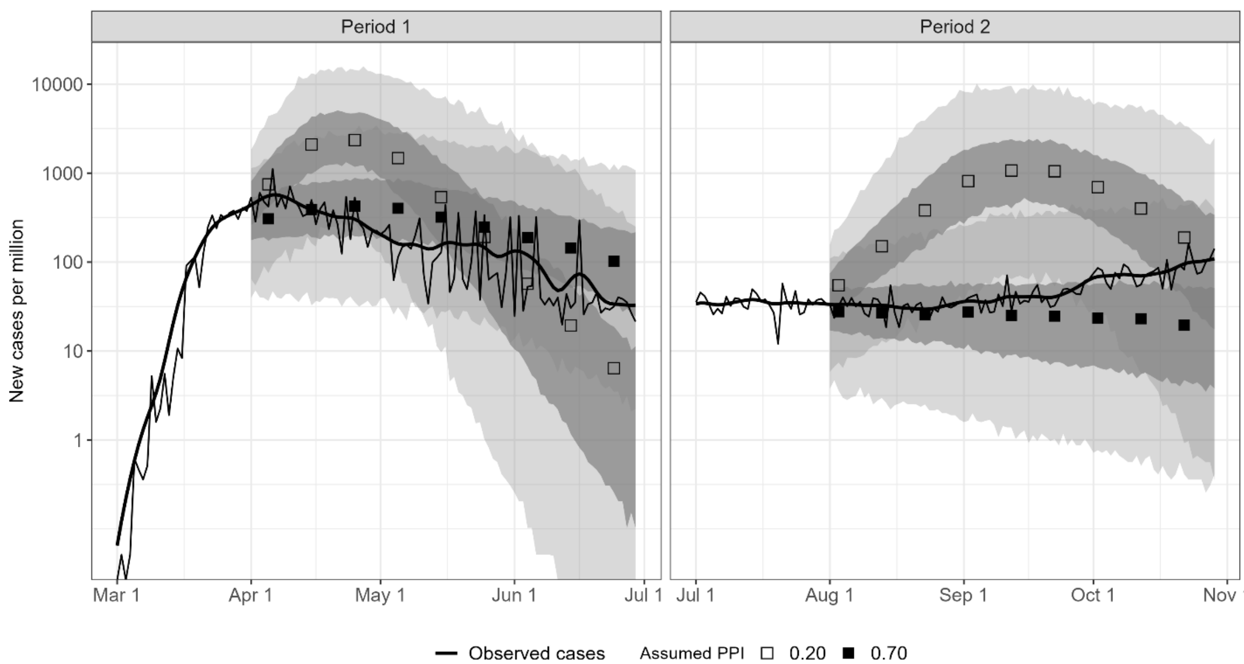

Figure 1 Simulated dynamics of new cases with high and low PPI

Bands represent central 50% and 95% posterior predictive intervals.

Figure 1 illustrates the estimates. The left panel shows the simulated trajectories of the new cases in New York after April 1 in continuation of the dynamic observed over March 2020. The simulations are conducted under the assumptions that the PPI is fixed at 0.70 and that the PPI is reduced to 0.20. These simulations show that a reduction of the stringency of policies would have delayed reaching the peak in the number of cases until May and lead to an overall higher number of cases. The right panel shows similar simulations conducted for the period starting on August 1, 2020.

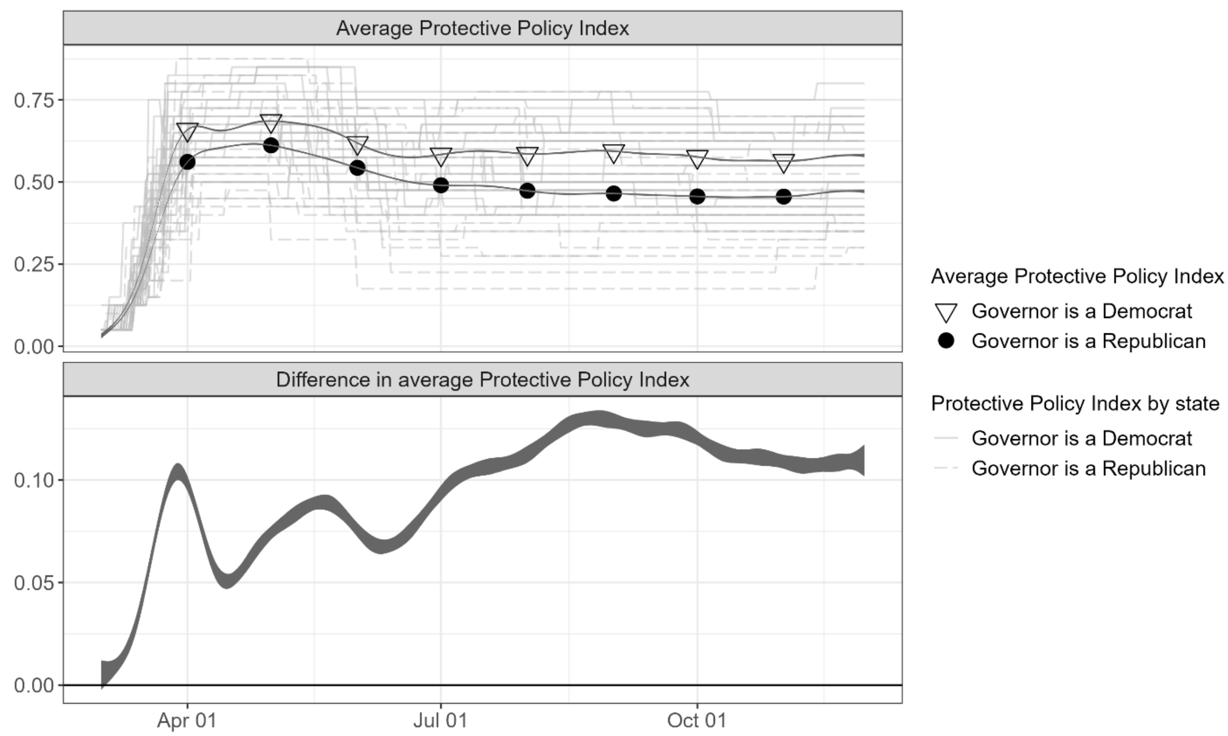

Figure 2 Dynamics of average PPI in states with Democrat and Republican governors

Bands represent central 50% and 95% posterior intervals.

The estimates indicate that on average the states with Republican governors had weaker public restrictions. Figure 2 plots the estimated dynamics of the averages of Total PPI in the states with Democratic and Republican governors, as well as the dynamics of the difference in averages. Between late March and November 2020, the average difference was between 5 and 15 percentage points. That said, there is significant variation within both groups of states, possibly attributable to the differences in the epidemiological situation and the ideological characteristics of state electorates. Republican governors in more liberal states (Massachusetts, Vermont, and Maryland) pursued more aggressive COVID-19 policy.

Discussion

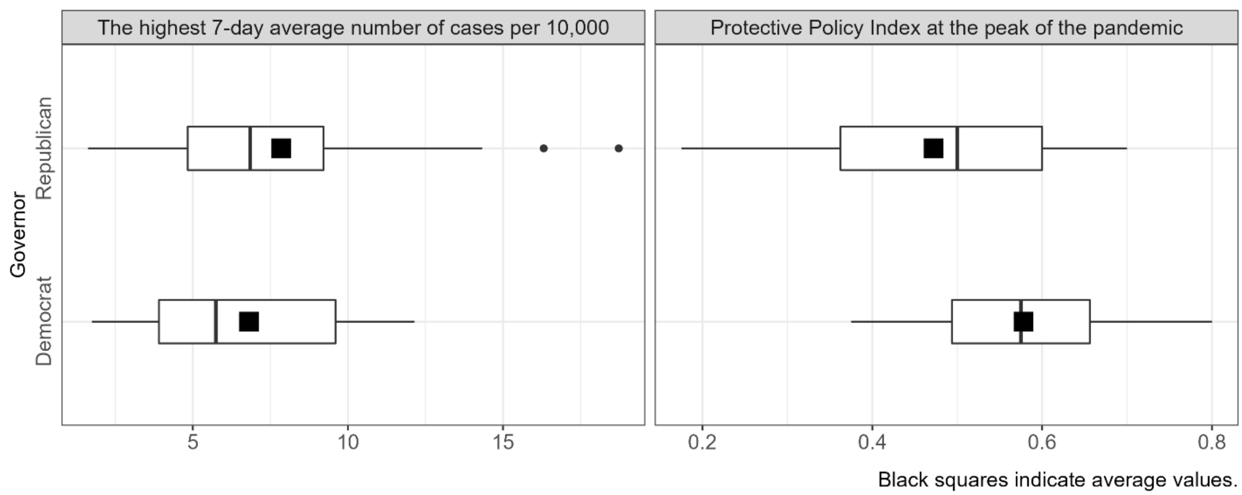

Figure 3 Number of new cases and PPI at the peaks of the pandemic

One way to parse out the ideological drivers of the pandemic policy-making from the public health expediency is by assuming that the public health incentives were at their highest (and uniformly high for all states) at the peaks of the pandemic. Figure 3 shows the distributions of new cases (left panel) and policy stringency (right panel) during the state-specific peaks of the pandemic. While the average number of cases was at least as high in the Republican-led states as in the Democrat-led states, the average PPI was lower by about 10 percentage points.

Limitations

The present study quantifies the differences in the average policy stringency between states led by Democratic and Republican governors over year 2020 and links this differences to the dynamics of COVID-19 cases. As with most analyses of observational data, the causality cannot be inferred, and the reader should not interpret the estimates without considering the employed modelling assumptions, including the constant rates of the underreporting of cases within a state, the constant rates of the removal the infected from the pool of the contagious, and the absence of re-infections or the spread of infections across state borders. The analysis of the observed differences in policy stringency does not separate the consequences of governors' intent from the constraints in public health policy making.

Conclusion

The evidence shows that the public health measures taken in the states with Democratic governors were on average 10 percentage points stricter over most of 2020. According to the model, these additional 10 percentage points in policy stringency reduced the expected number of cases by about eight percent.

These conclusions reinforce and extend the findings of Neelon et al.[1] that application of public health policy was politicized. This information further supports the need for delegating public health policy making to health professionals.

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