

## Institutional Origins of COVID-19 Public Health Protective Policy Response (PPI) Data Set v. 1.2

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## Abstract:

This is an original dataset of stringency of public health policy measures that were adopted in response to COVID-19 worldwide by governments at different levels January 24 and April 30 2020.

The national file includes daily national level aggregates for 64 countries.

The regional file includes daily sub-national level aggregates for Canada and the USA.

To measure COVID-19 mitigation policy responses, we gathered data on policies that national and subnational policymakers adopted within fifteen public health categories: state of emergency, self-isolation and quarantine, border closures, limits on social gatherings, school closings, closure of entertainment venues, closure of restaurants, closure of non-essential businesses, closure of government offices, work from home requirements, lockdowns and curfews, public transportation closures, and mandatory wearing of PPE. We identify and code national and subnational public health policies for each subnational unit in 64 countries (subnational aggregates are presently published of USA and Canada only), including countries in North America, Central America, South America, Europe, the Middle East, and Asia. We rely primarily on government resources, press releases, and news sources, dating policies based on first announcement. Note that between and within the policy categories, there is variation on stringency, with some policy adoptions being more stringent than others (i.e. self-isolation versus lockdowns, partial school closings versus full school closings). To this end, we weighed more stringent policies in each category in the index more heavily.

Based on coded public health policy responses to COVID-19, we calculate the Public Health *Protective Policy Indices* (PPI): *Regional* PPI for each subnational unit on each day; *National* PPI for a country on each day, based on national level policies; and *Total* PPI for each subnational unit on each day. The *Total* PPI reflects the strictest between the national and subnational policies adopted within each category for that unit for that day. The indices are scaled to range between 0 and 1. The *Average Total* PPI for each country-day is computed by weighing the different units' Total PPI values by the units' population shares. The indices apply solely to the measurable subnational and national public-health COVID-19 mitigation policy responses.

## Validation:

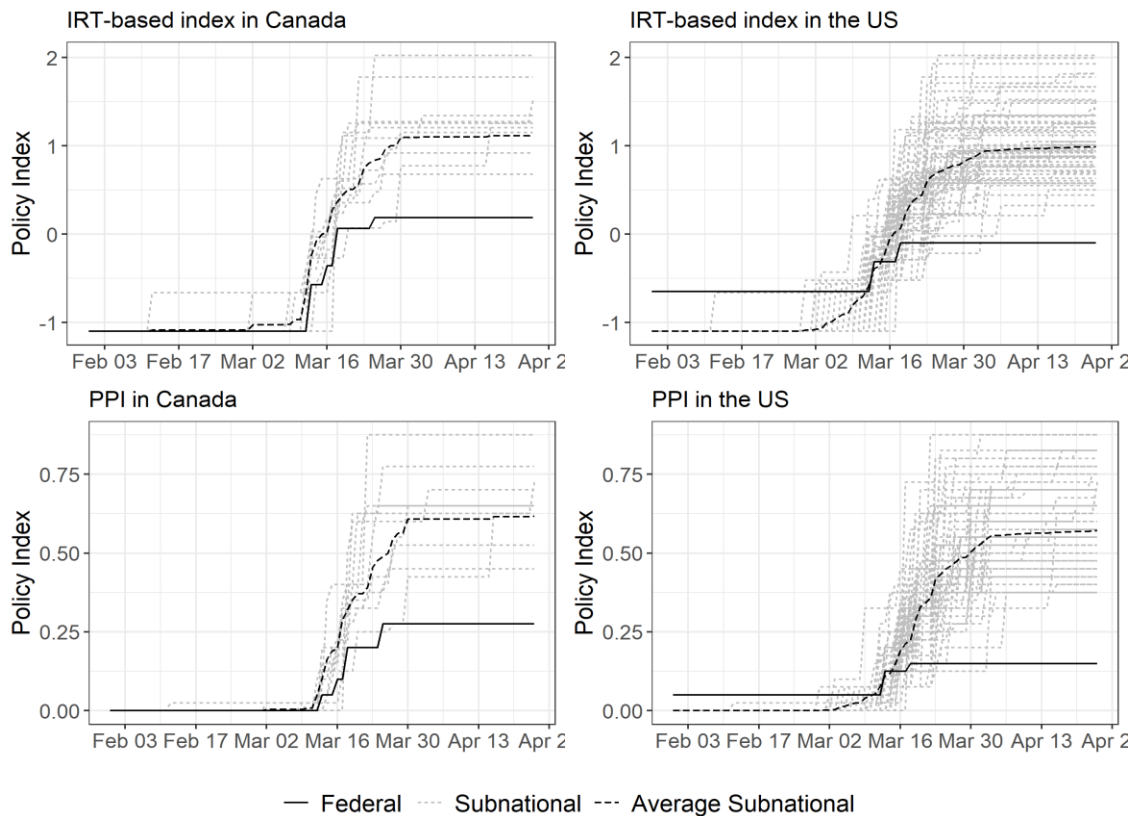
### Comparison of PPI with IRT-based Index

With scores for each category of policies as ordinal responses, we applied the *ordIRT* function<sup>1</sup> (Imai et al. 2016, p. 640). The model underlying this function is

$$\begin{aligned} Pr(y_{ij} = 0) &= \Phi(-\tau_j \alpha_j^* - \tau_j x_i' \beta_j) \\ Pr(y_{ij} = 1) &= \Phi(-\tau_j \alpha_j^* + \tau_j - \tau_j x_i' \beta_j) - \Phi(-\tau_j \alpha_j^* - \tau_j x_i' \beta_j) \\ Pr(y_{ij} = 2) &= 1 - \Phi(-\tau_j \alpha_j^* + \tau_j - \tau_j x_i' \beta_j) \end{aligned}$$

where  $y_{ij}$  is the level of response of a government on a particular date ( $i$ ) in a given category ( $j$ ),  $\beta_j$  reflects the discriminating power of the item, and  $\alpha_j^*$  and  $\tau_j$  are auxiliary parameters (jointly fixing the thresholds defining the observed categories).  $x_i$  is the aggressiveness of the policies. The procedure estimates  $x_i$  as well as  $\beta_j$ ,  $\alpha_j^*$ , and  $\tau_j$ . We treat the estimates of  $x_i$  as the estimates of the stringency of public health measures for the purpose of comparison with the PPI.

The resulting subnational version of the index is correlated with the subnational PPI at 0.987, while the resulting overall score is correlated with the overall PPI at 0.990.



<sup>1</sup> Imai, K., Lo, J., Olmsted, J. 2016. “Fast Estimation of Ideal Points with Massive Data.” *American Political Science Review* 110(4): 631-656.

## Comparison of the PPI index with the OxCGRT index

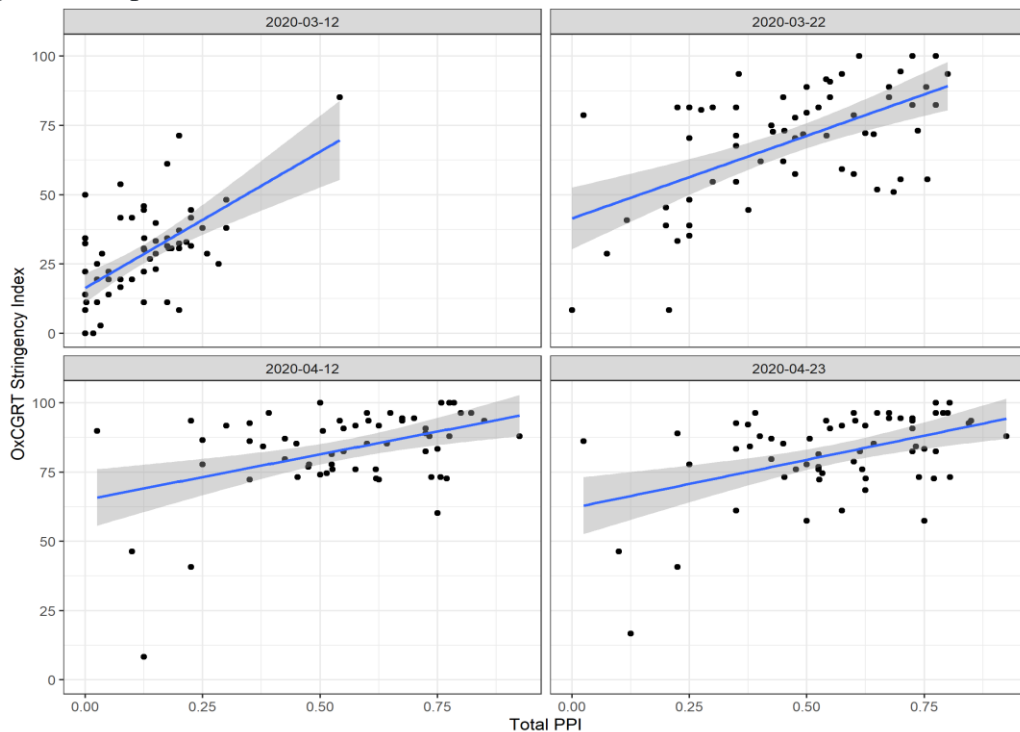
The OxCGRT project at Oxford<sup>2</sup> (Hale et al. 2020) maintains an index of the stringency of the government response to COVID-19. This index is similar to our index in that it aggregates information about policies along various dimension of non-medical public health response. The total number of policy categories used in the computation of OxCGRT's stringency index is 9, and 7 of them are similar to the ones used in the computation of PPI.

Similar dimensions include:

- C1\_School closing
- C2\_Workplace closing
- C4\_Restrictions on gatherings
- C5\_Close public transport
- C6\_Stay at home requirements
- C7\_Restrictions on internal movement
- C8\_International travel controls

PPI analogue of "C3\_Cancel public events" is "closing of public venues." PPI additionally accounts for the closure of non-essential businesses, the PPE requirements (such as masks) and the required self-isolation and quarantine for the individuals travelling from COVID hotspots or known to have been exposed.

In our global sample, overall PPI is correlated with OxCGRT index at 0.901.



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<sup>2</sup> Hale, Thomas, Sam Webster, Anna Petherick, Toby Phillips, and Beatriz Kira (2020). Oxford COVID-19 Government Response Tracker, Blavatnik School of Government.

Publications using PPI data as of September 28 2020:

Shvetsova, Olga, Andrei Zhirnov, Julie VanDusky-Allen, Abdul Basit Adeel, Michael Catalano, Olivia Catalano, Frank Giannelli, Ezgi Muftuoglu, Tara Riggs, Mehmet Halit Sezgin, Naveed Tahir, Tianyi Zhao. 2020. [“Institutional Origins of Protective COVID-19 Public Health Policy Responses: Informational and Authority Redundancies and Policy Stringency”](#). *Journal of Political Institutions and Political Economy*. 1, 4.

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DOI: <https://doi.org/10.3138/cpp.2020-101>

Julie VanDusky Allen, Olga Shvetsova, and Andrei Zhirnov, [COVID-19 Policy Response in Argentina, Brazil, and Mexico: Three Different National-Subnational Approaches](#) July 2 2020, *Duck of Minerva*

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Riggs, Tara and Catalano, Michael. 2020. [“\(S\)He who acts first: gendered gubernatorial response to pandemic in divided government”](#). Working Papers Series.

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