

TOWARDS ANTICIPATING RAPID GLOBAL POLICY SHIFTS

An agent-based model of the 2020 tipping point in global covid policy response with integrated data assimilation



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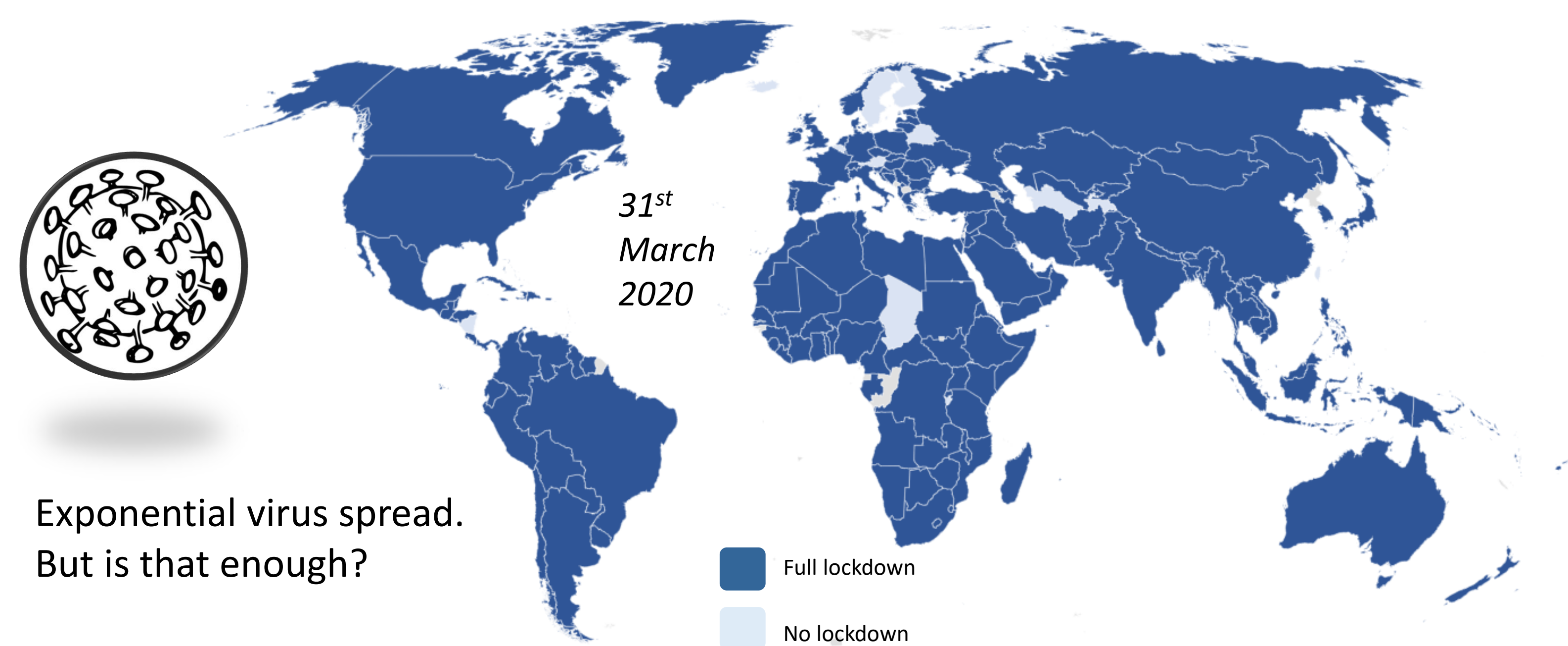
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An entire world in lockdown.. How?

Solutions to the climate crisis require global policy tipping points. But they never seem to happen. In spring 2020, during the first global wave of the COVID-19 pandemic, such a rapid policy tipping point was observed....



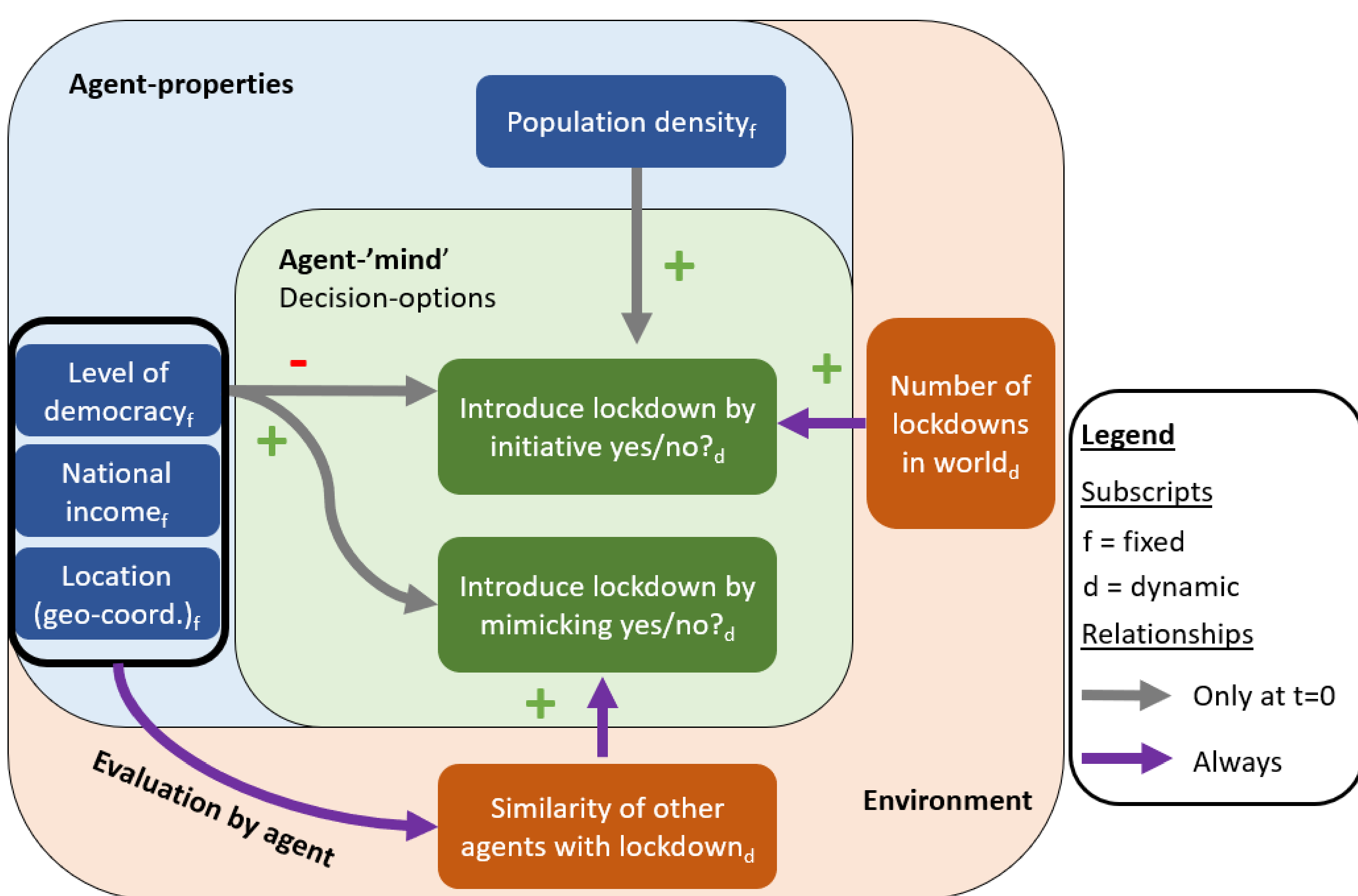
Exponential virus spread.
But is that enough?

Hypothesis: Countries acted like individual people. They mimicked 'peers'.

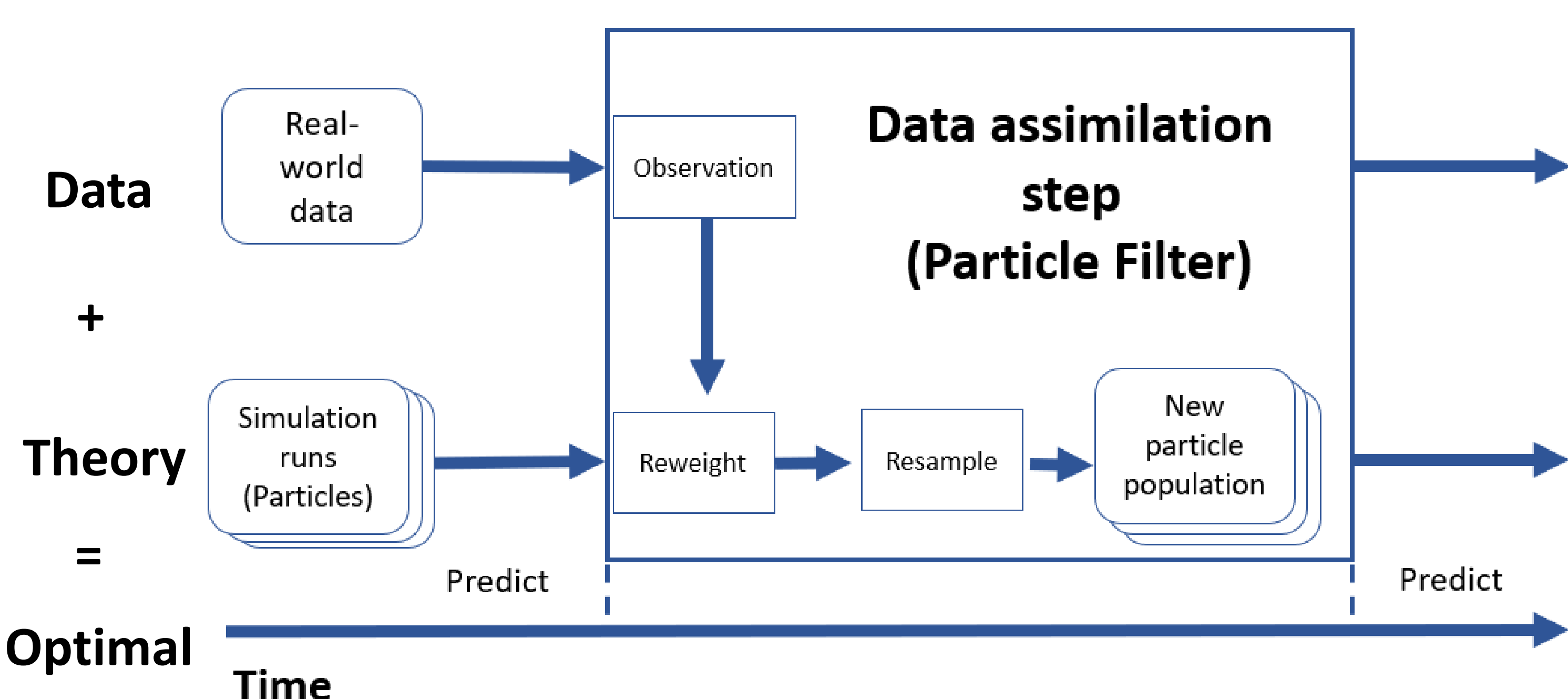
Objective: Reproducing lockdown adoption pattern without knowledge about virus spread.

No-maths model description

The principal idea of the model is that the adoption of lockdowns across countries can be described independently of the actual COVID-case numbers across countries. The main mechanism is that the agents/countries mimic other countries that have adopted a lockdown and are similar to themselves.

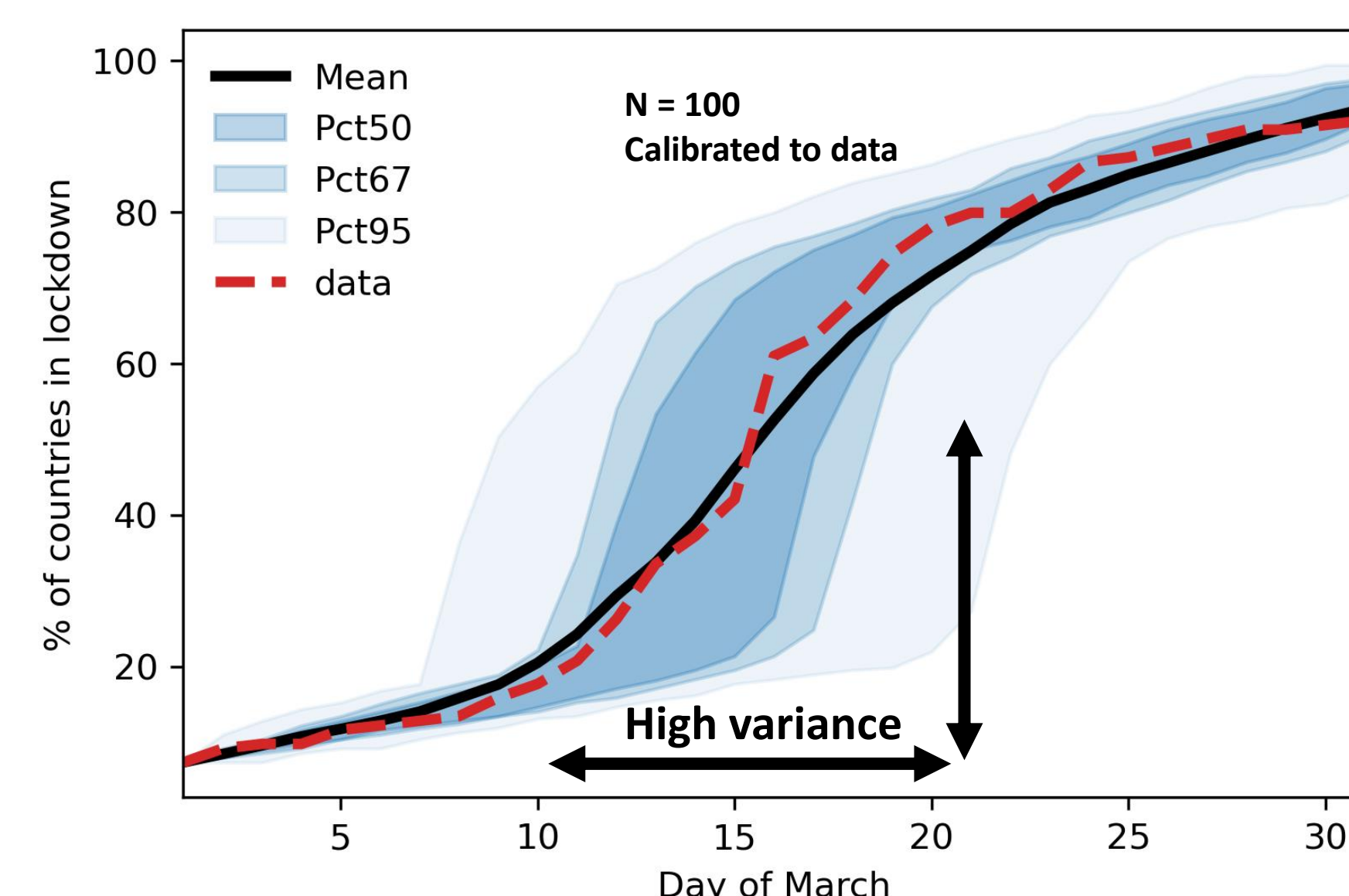


Real-time observations to make better prediction



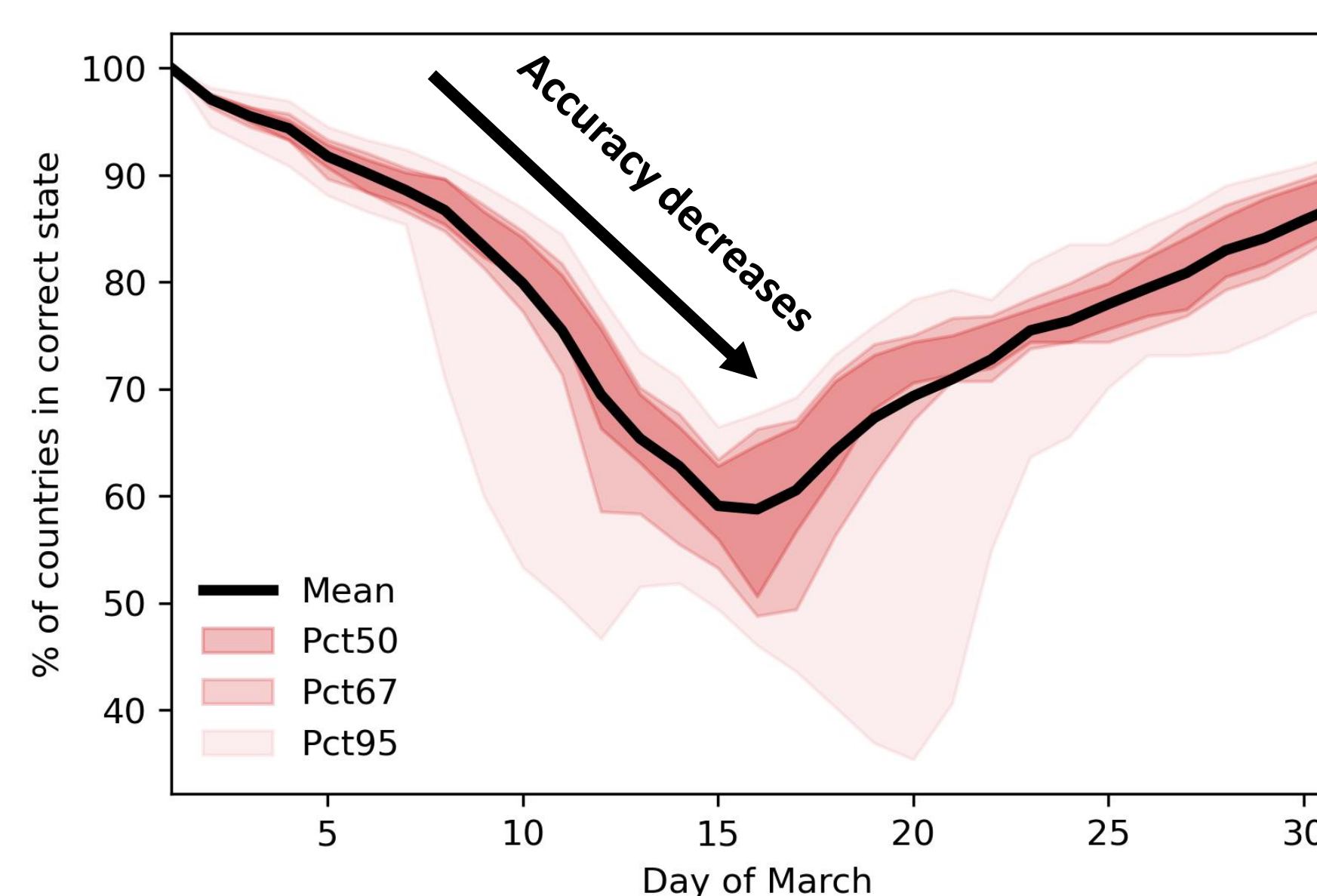
Results: From Macro to Micro!

Model base run



Result Figure 1:
MACRO ACCURACY

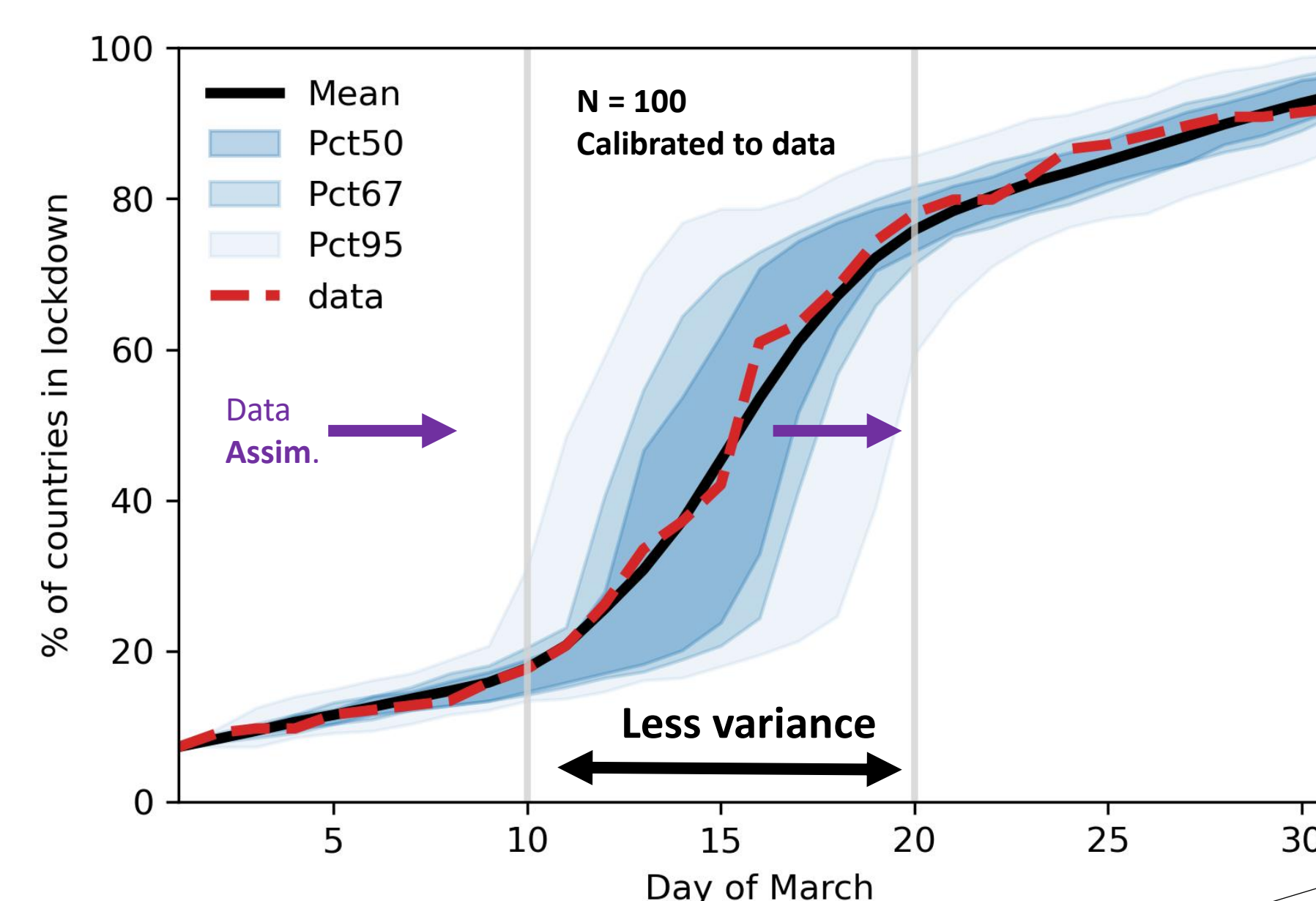
We can relatively well predict the aggregate diffusion curve, or, in other words, the total number of countries in Lockdown. But the variance is high.



Result Figure 2:
MICRO ACCURACY

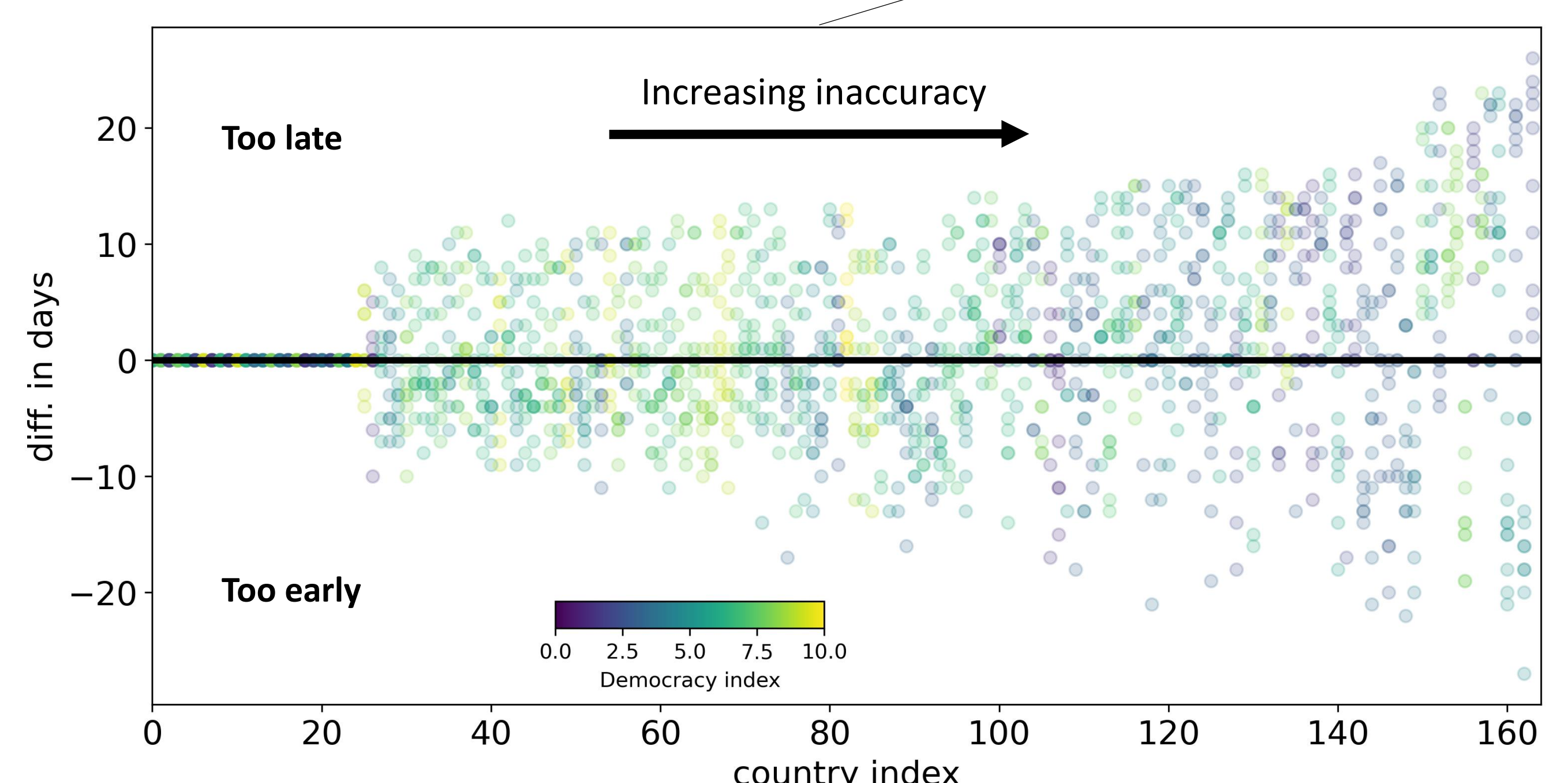
We struggle with predicting accurately which specific countries are in lockdown when exactly, especially during the critical transition phase!

(Pseudo-)Particle Filter and individual countries



Result Figure 3:
A Particle Filter does reduce variance of model results and hence the reliability.

Result Figure 4:
This Figure illustrates over 10 simulation runs whether individual countries have been accurately predicted.



What's next?

- ❑ Make model better, discuss with political scientists
- ❑ Study whether generalizable to climate crisis
 - Private jet ban?
 - Carbon taxes, green subsidies etc.?
- ❑ Activists are right to increase 'alarm'
 - (Justified) fear of the pandemic induced the mimicking behaviour
- ❑ Climate-economic ABMs with data assimilation

Your ideas?