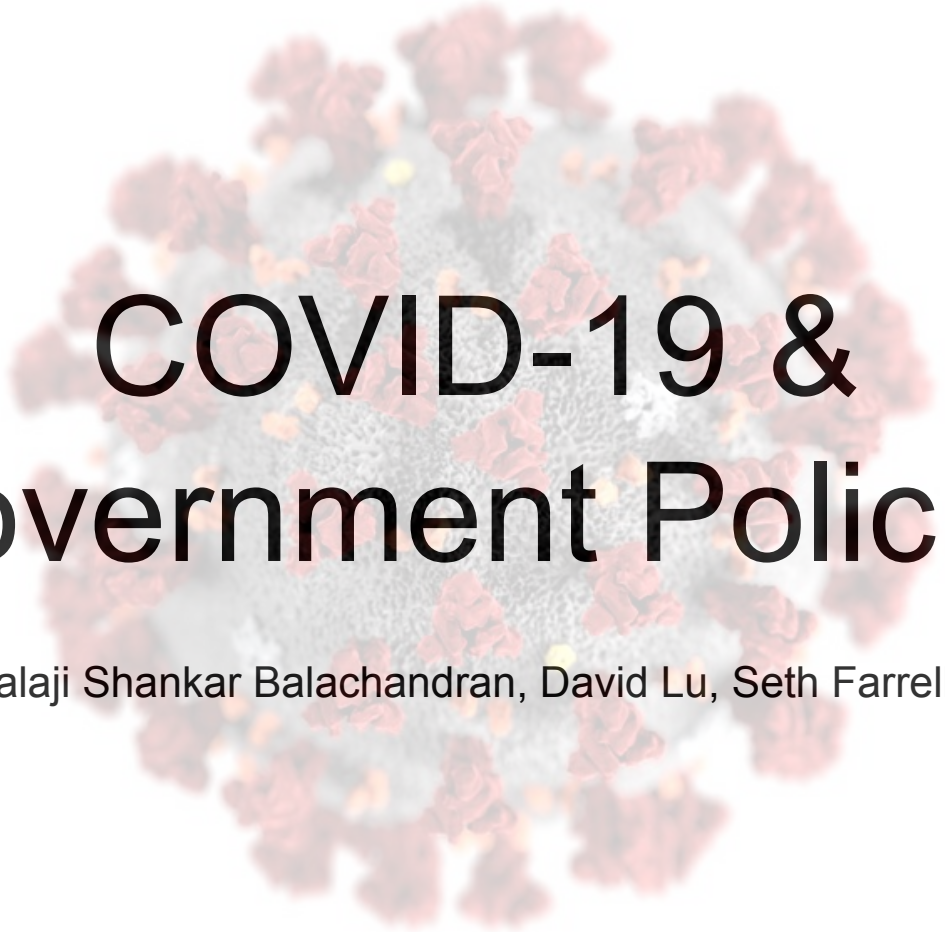
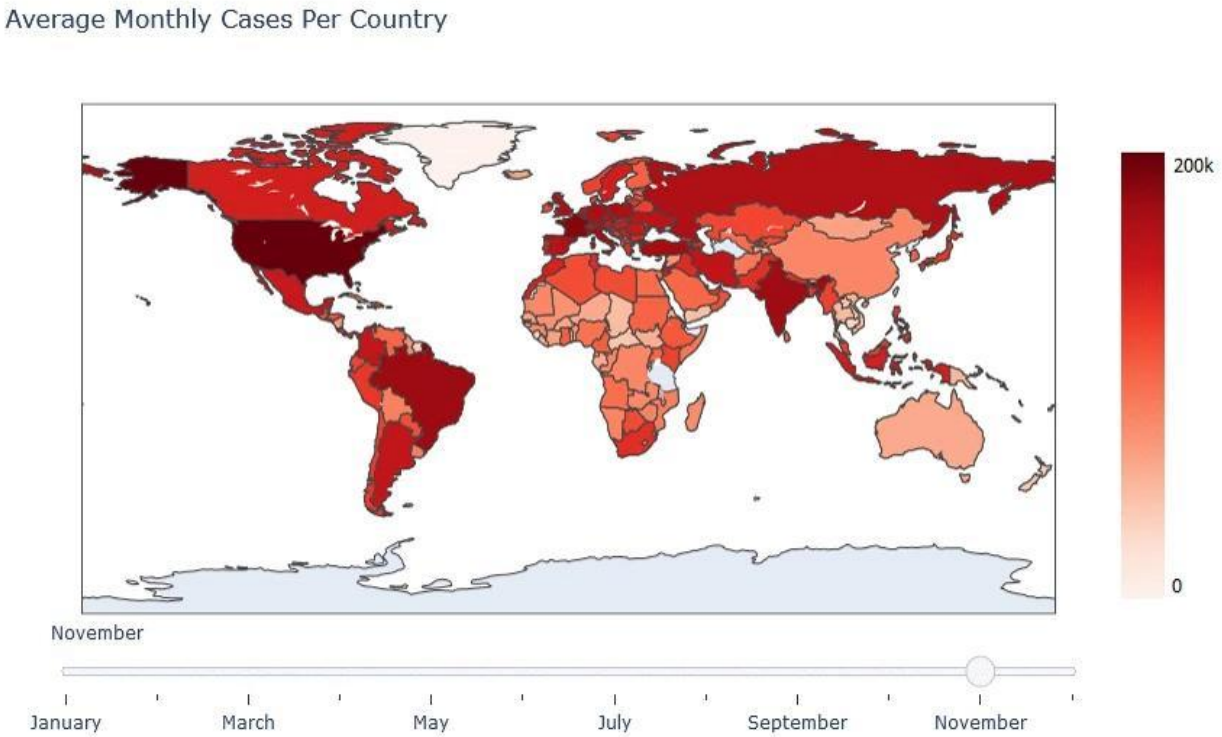


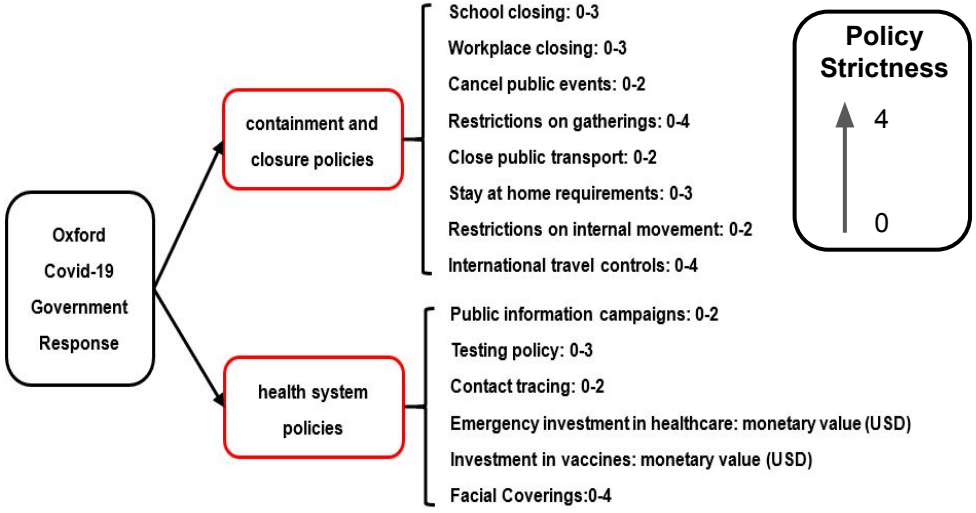
COVID-19 & Government Policies

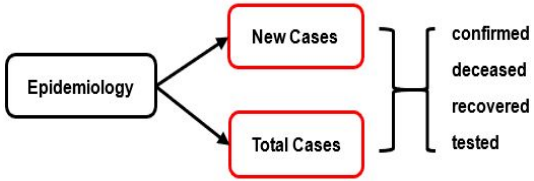
Team 24: Balaji Shankar Balachandran, David Lu, Seth Farrell, Wei Wang

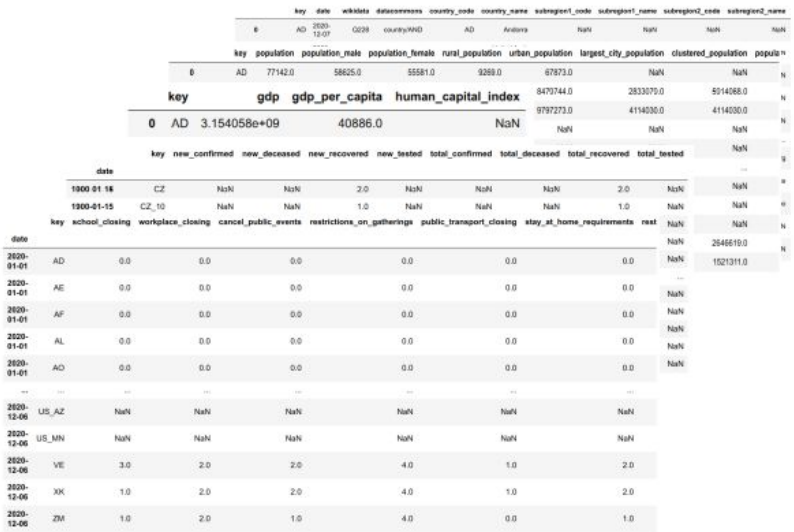
COVID-19's International Impact



Dataset







key	population	population_male	population_female	rural_population	urban_population	largest_city_population	clustered_population	population_density
AD	77142.0	58625.0	55581.0	9269.0	67873.0	NaN	NaN	NaN

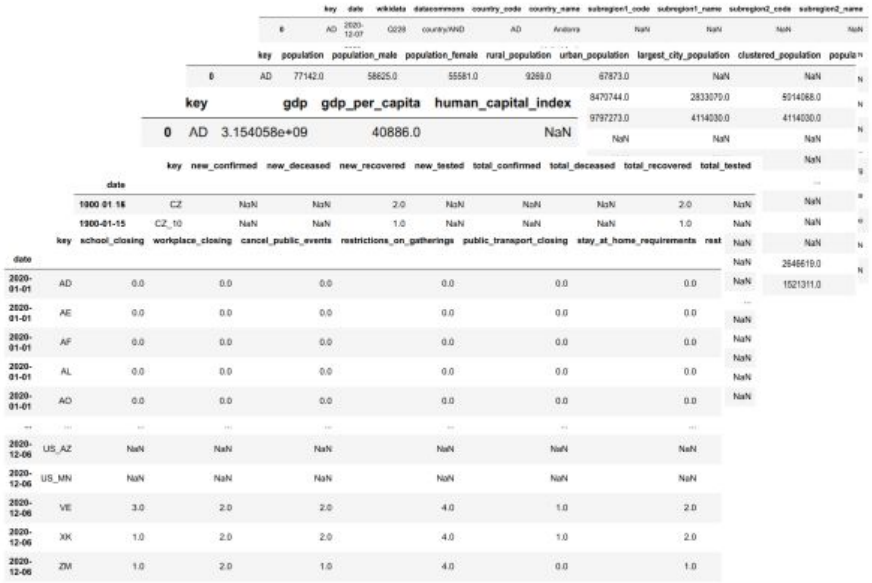
key	gdp	gdp_per_capita	human_capital_index
AD	3.154058e+09	40886.0	NaN

key	new_confirmed	new_deceased	new_recovered	new_tested	total_confirmed	total_deceased	total_recovered	total_tested
CZ	NaN	NaN	2.0	NaN	NaN	NaN	2.0	NaN
CZ_10	NaN	NaN	1.0	NaN	NaN	NaN	1.0	NaN

date	key	school_closing	workplace_closing	cancel_public_events	restrictions_on_gatherings	public_transport_closing	stay_at_home_requirements	rest
2020-01-01	AD	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AE	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AF	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AL	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AO	0.0	0.0	0.0	0.0	0.0	0.0	
2020-12-06	US_AZ	NaN	NaN	NaN	NaN	NaN	NaN	
2020-12-06	US_MN	NaN	NaN	NaN	NaN	NaN	NaN	
2020-12-06	VE	3.0	2.0	2.0	4.0	1.0	2.0	
2020-12-06	XK	1.0	2.0	2.0	4.0	1.0	2.0	
2020-12-06	ZM	1.0	2.0	1.0	4.0	0.0	1.0	

Google Cloud Platform dataset

Data Pre-processing



	key	gdp	gdp_per_capita	human_capital_index
0	AD	3.154058e+09	40886.0	NaN

	key	new_confirmed	new_deceased	new_recovered	new_tested	total_confirmed	total_deceased	total_recovered	total_tested
date									
1900-01-16	CZ	NaN	NaN	2.0	NaN	NaN	NaN	2.0	NaN
1900-01-15	CZ_10	NaN	NaN	1.0	NaN	NaN	NaN	1.0	NaN

date	key	school_closing	workplace_closing	cancel_public_events	restrictions_on_gatherings	public_transport_closing	stay_at_home_requirements	rest
2020-01-01	AD	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AE	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AF	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AL	0.0	0.0	0.0	0.0	0.0	0.0	
2020-01-01	AO	0.0	0.0	0.0	0.0	0.0	0.0	
...	...	...	...	...	...	...	...	
2020-12-06	US_AZ	NaN	NaN	NaN	NaN	NaN	NaN	
2020-12-06	US_MN	NaN	NaN	NaN	NaN	NaN	NaN	
2020-12-06	VE	3.0	2.0	2.0	4.0	1.0	2.0	
2020-12-06	XK	1.0	2.0	2.0	4.0	1.0	2.0	
2020-12-06	ZM	1.0	2.0	1.0	4.0	0.0	1.0	

1. Data normalization

	date	key	testing_policy	contact_tracing
87258	2020-12-06	VE	3.0	0.0
87259	2020-12-06	XK	3.0	1.0
87260	2020-12-06	ZM	3.0	2.0

→

	date	key	testing_policy	contact_tracing
87258	2020-12-06	VE	1.0	0.0
87259	2020-12-06	XK	1.0	0.5
87260	2020-12-06	ZM	1.0	1.0

2. Average across time

date	
2020-01-01	0.0
2020-01-02	0.0
2020-01-03	0.0
2020-01-04	0.0
2020-01-05	0.0
...	...
2020-12-01	5329.0
2020-12-02	6307.0
2020-12-03	6494.0
2020-12-04	6300.0
2020-12-05	6352.0

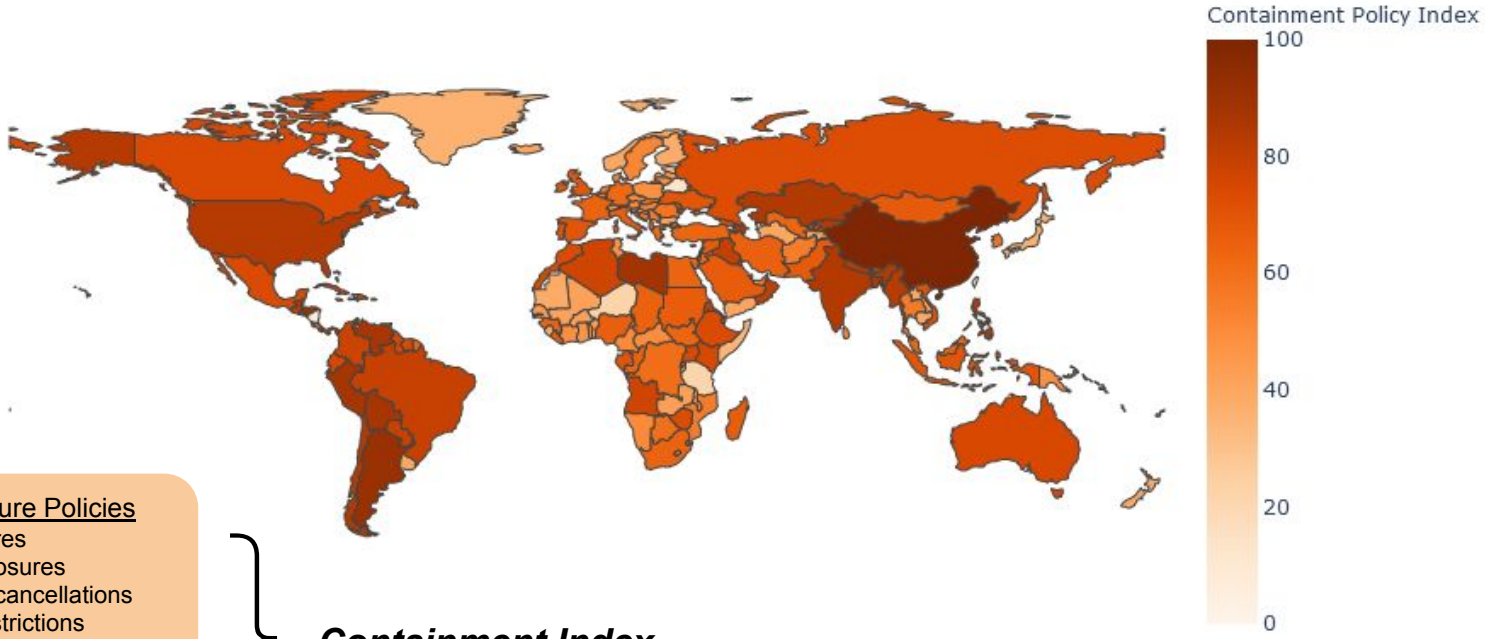
→

date	
2020-01-01	NaN
2020-01-02	NaN
2020-01-03	NaN
2020-01-04	NaN
2020-01-05	NaN
...	...
2020-12-01	5860.571429
2020-12-02	6044.142857
2020-12-03	6167.428571
2020-12-04	6215.000000
2020-12-05	6194.428571

Methodology

- How can government responses be quantified?
- What strategies worked for successful countries?
- How did the US fare at the state-level?
- How should governments handle subsequent waves?

Containment Index

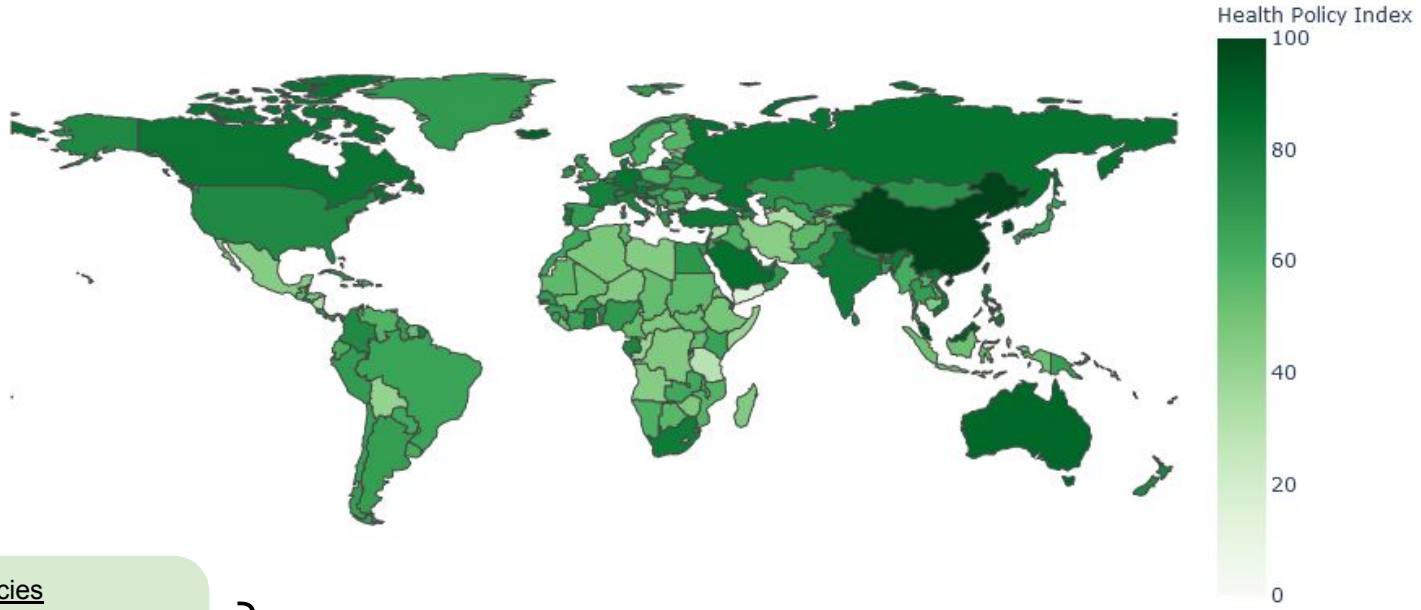


Containment & Closure Policies

- ➔ School closures
- ➔ Workplace closures
- ➔ Public event cancellations
- ➔ Gathering restrictions
- ➔ Public transport closures
- ➔ Stay at home requirements
- ➔ Internal border controls
- ➔ International border controls

Containment Index

Health Index

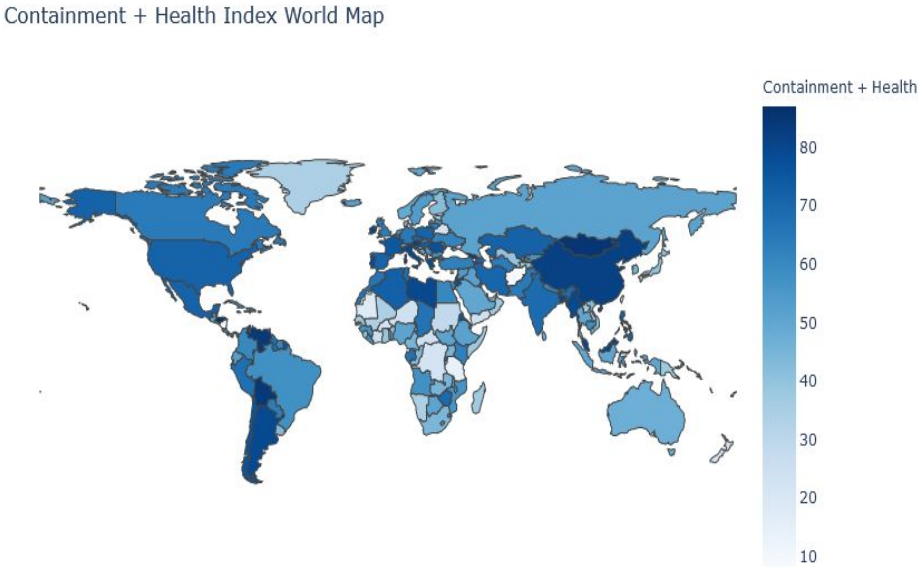


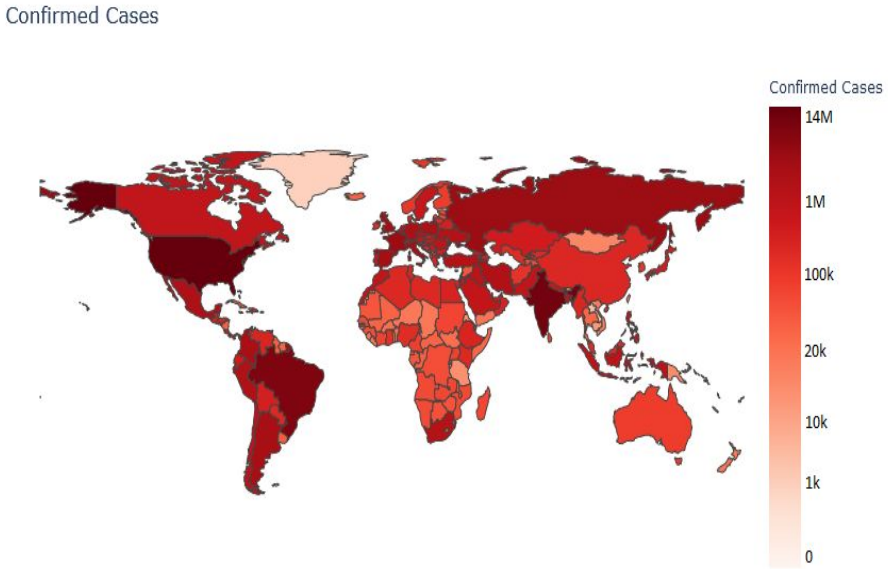
Health System Policies

- ➔ Public information campaigns
- ➔ Testing reach
- ➔ Contact tracing infrastructure
- ➔ Face covering requirements

} ***Health Index***

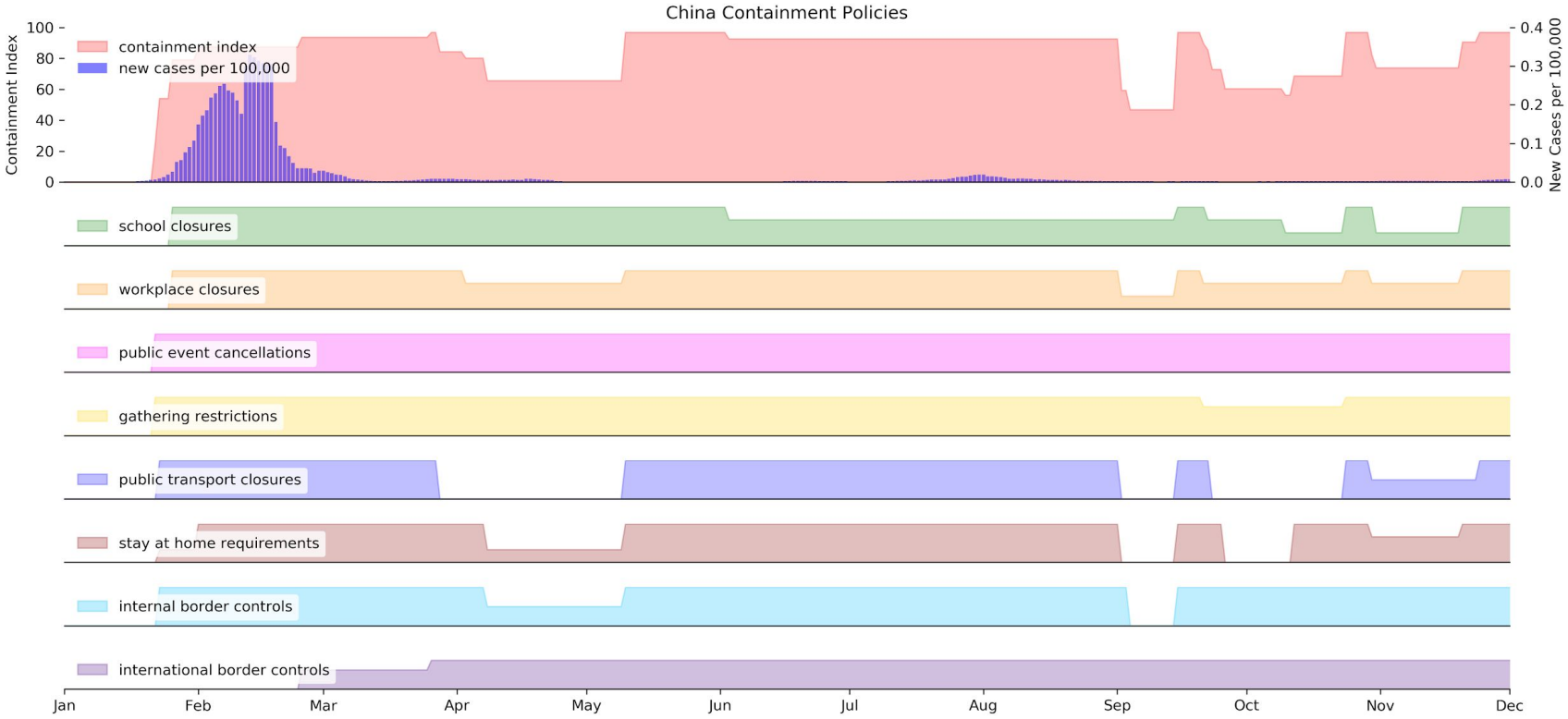
Combined Index & Confirmed Cases



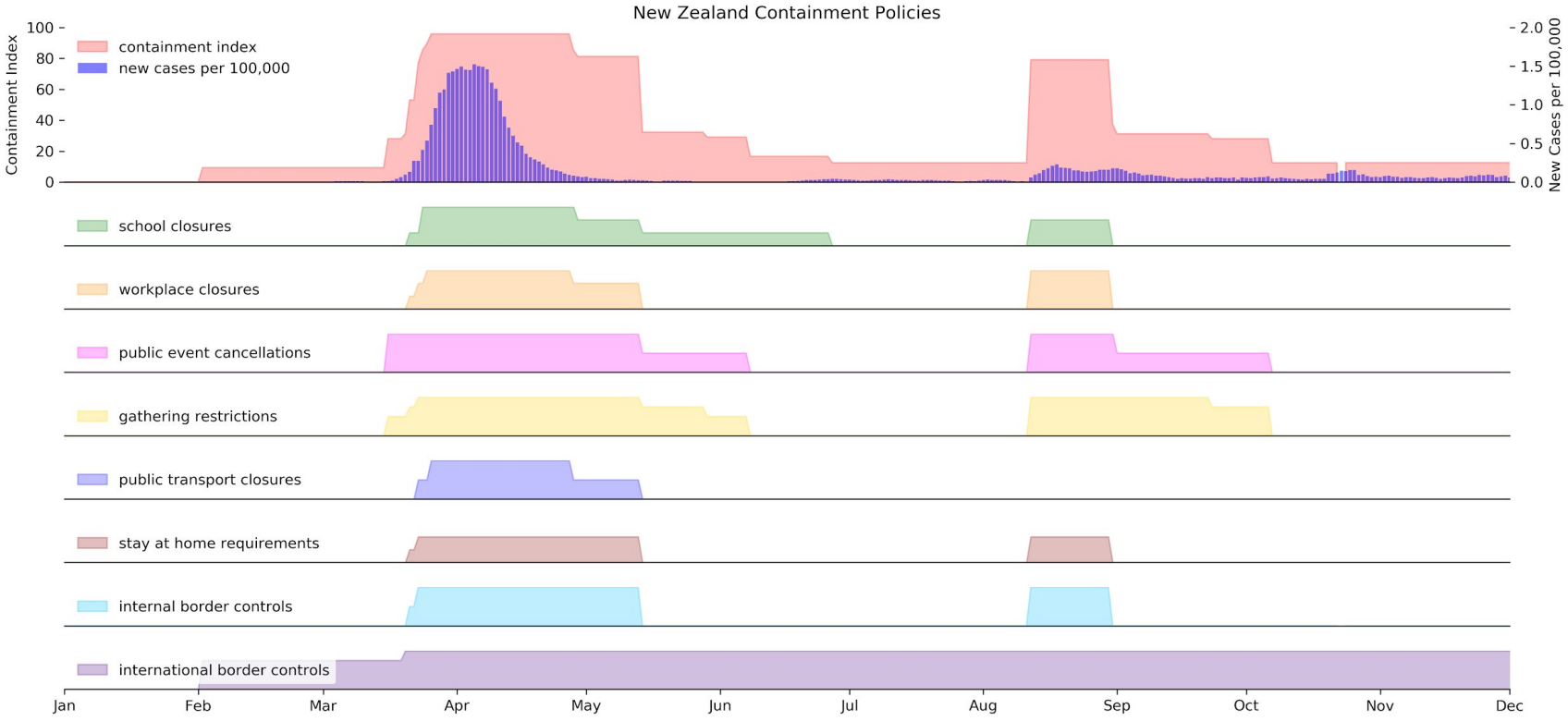


Higher Index → **Fewer Cases**

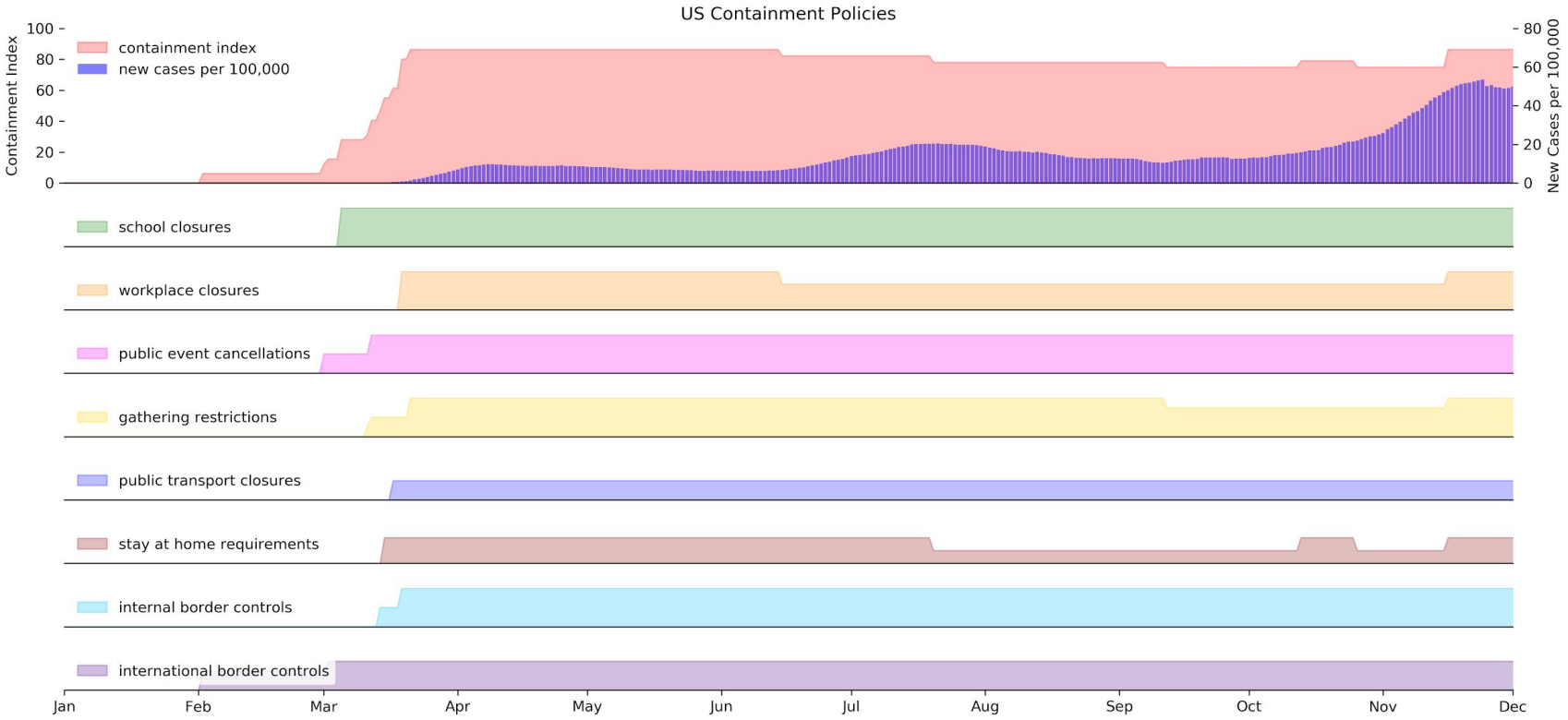
Case Study - China



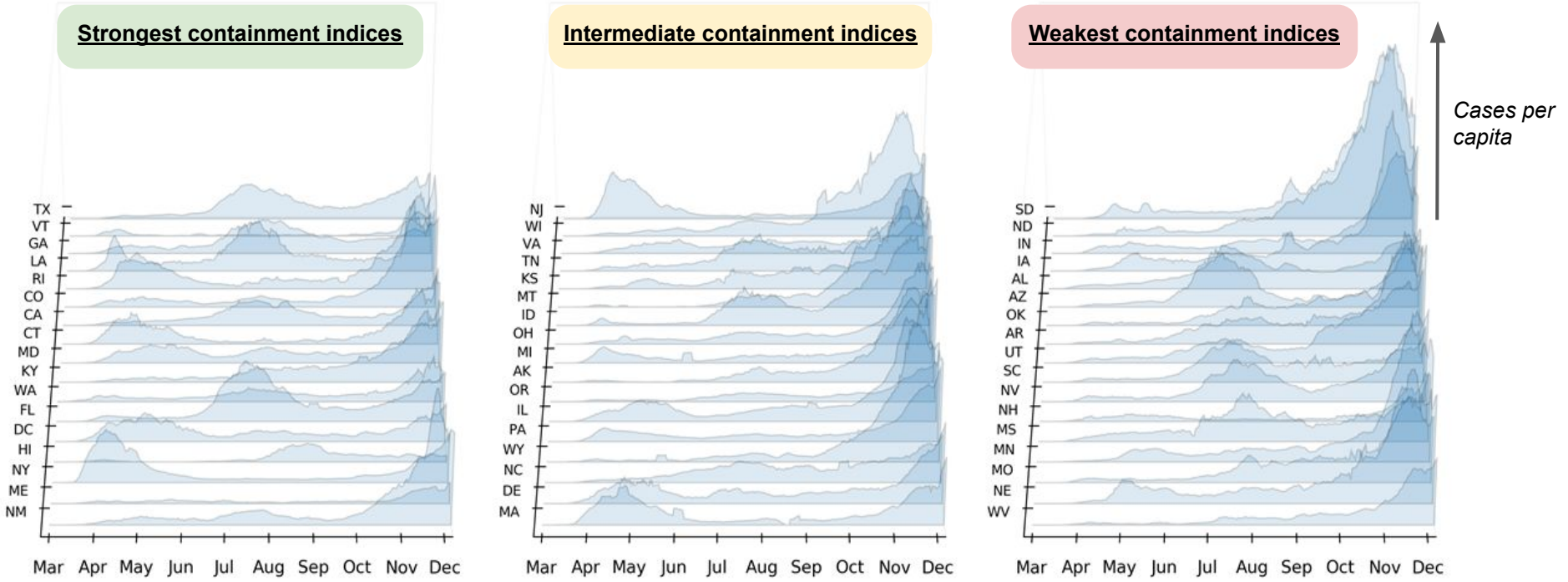
Case Study - New Zealand



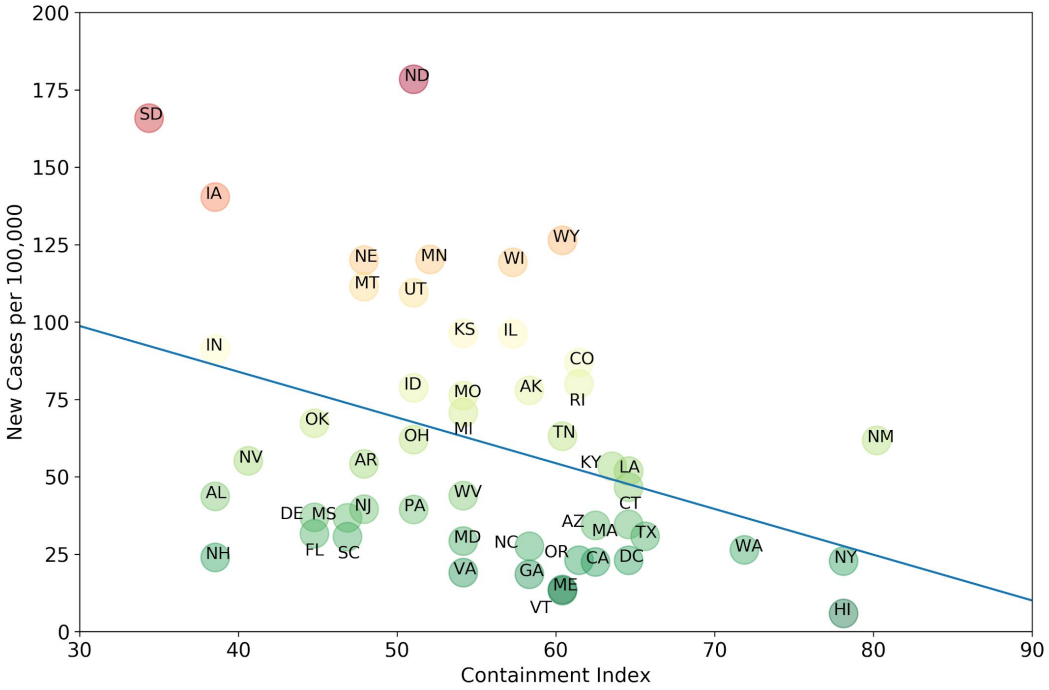
Case Study - United States



State-level Comparison

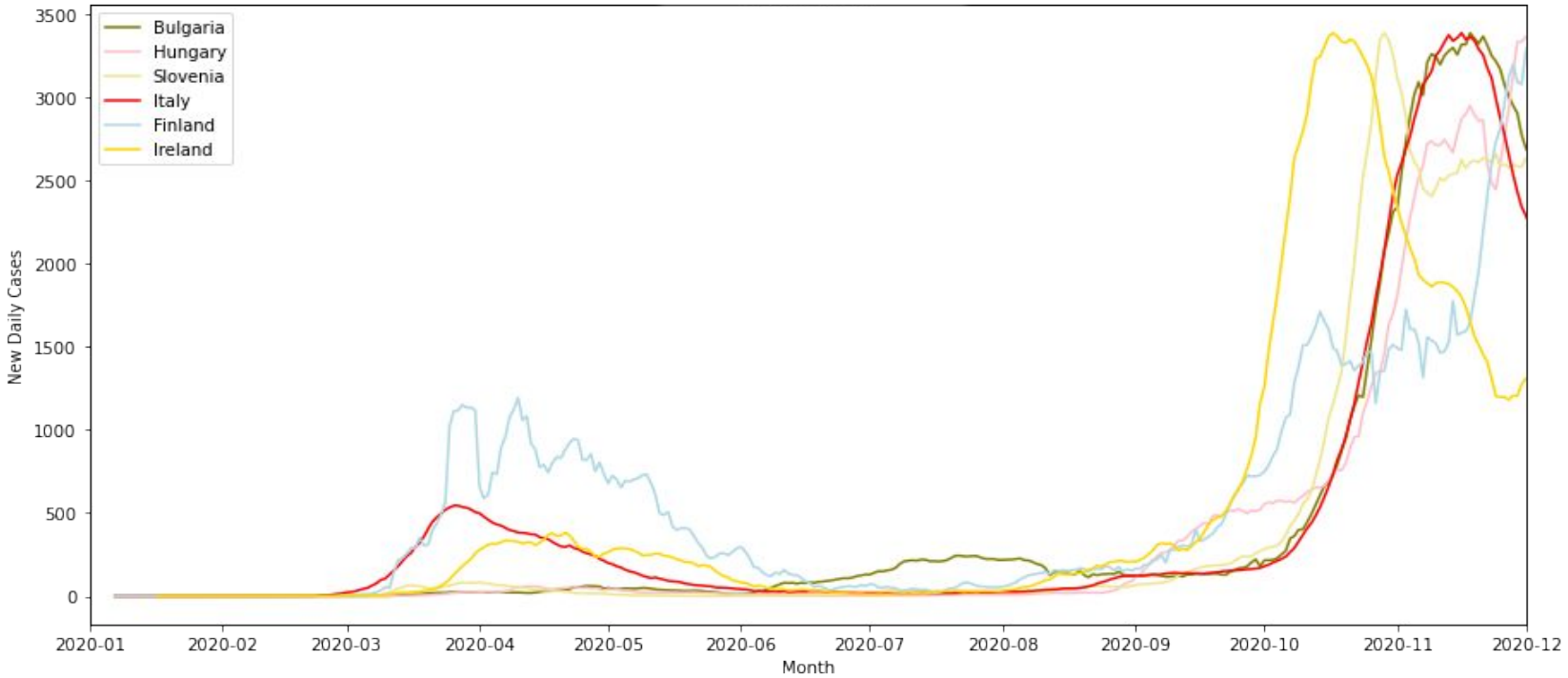


State-level Comparison

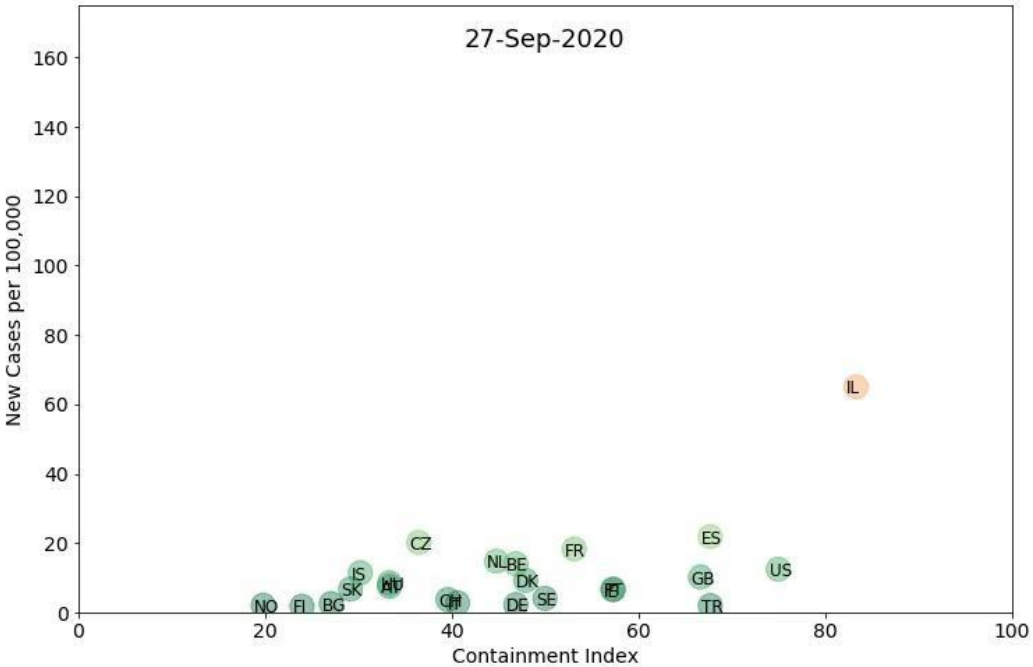


Higher Index → **Fewer Cases**

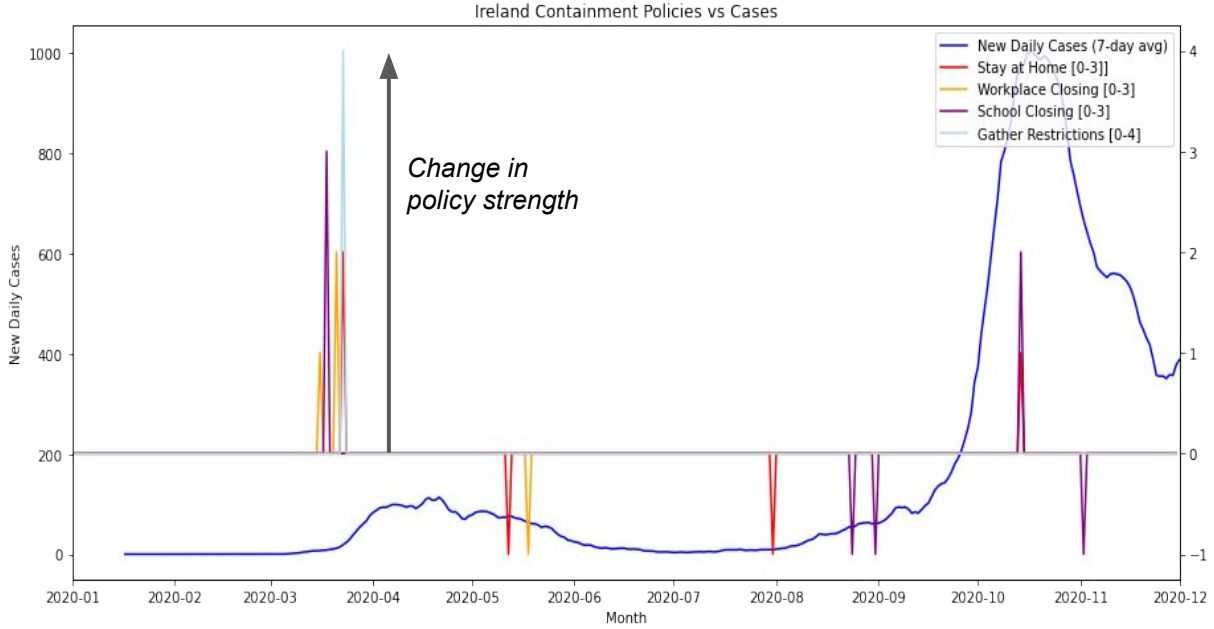
Europe’s Second Wave



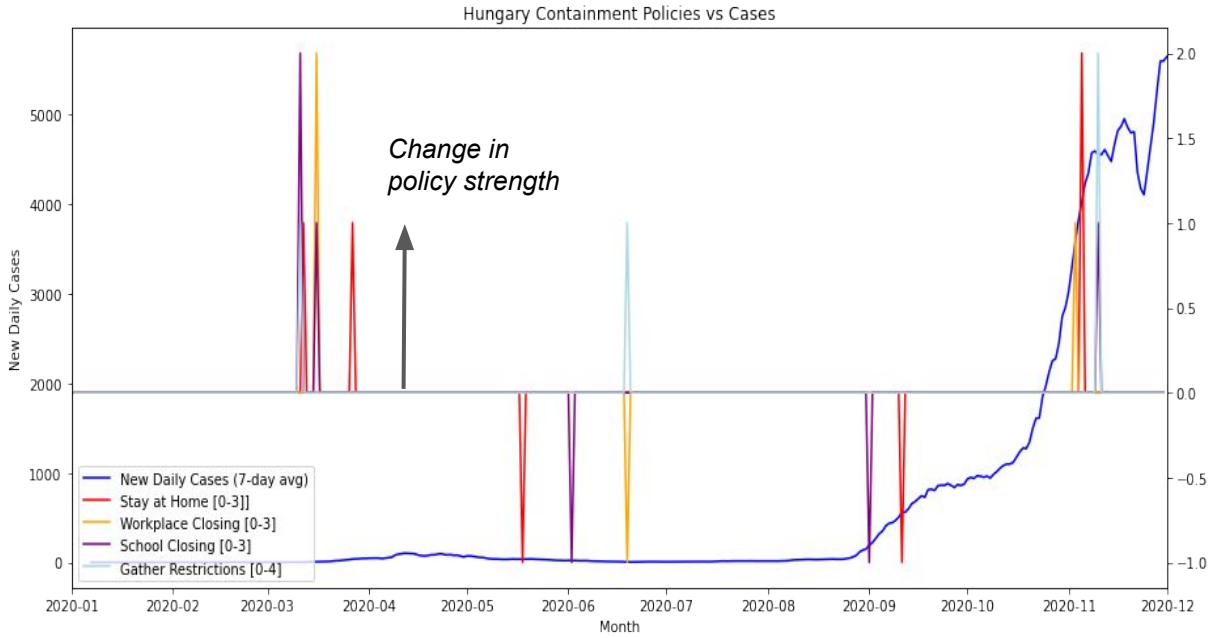
Europe’s Second Wave



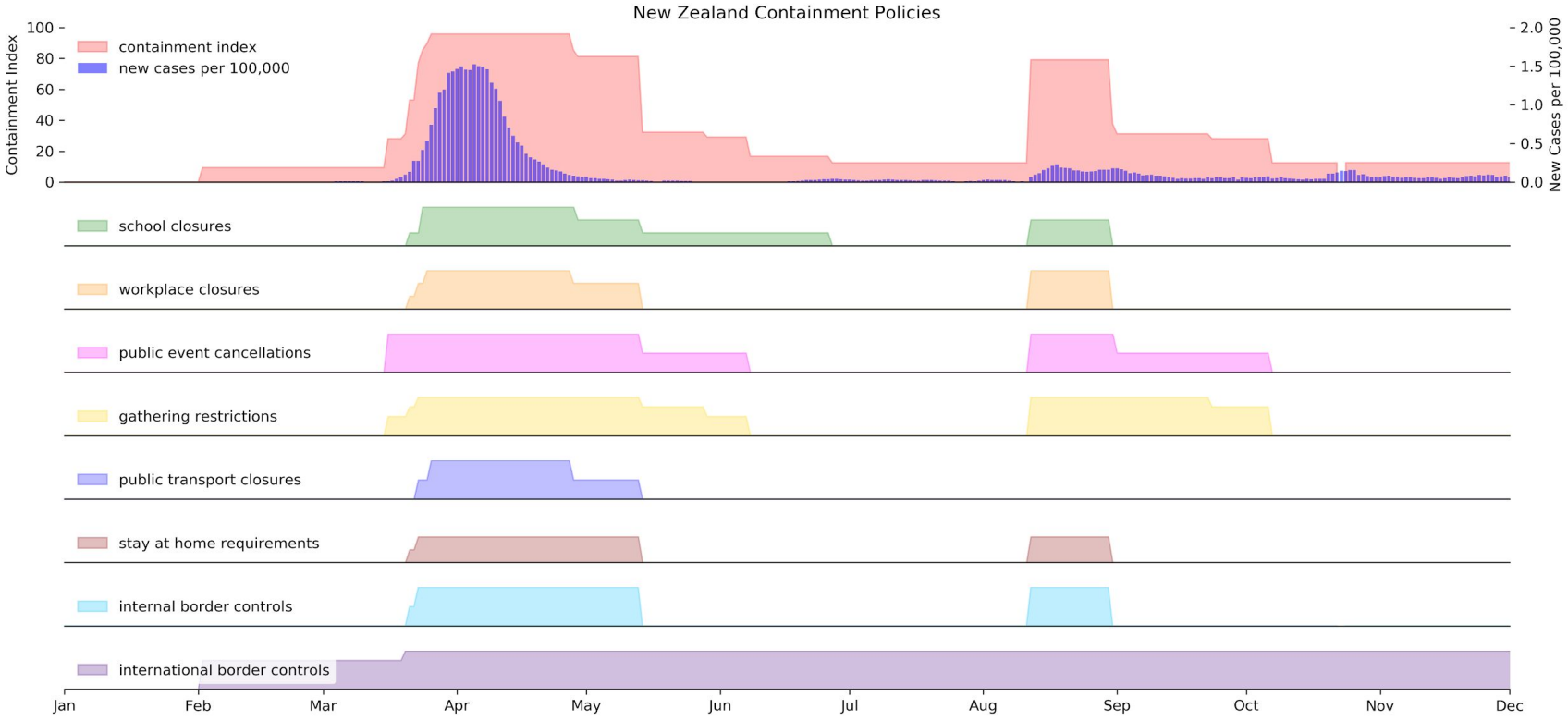
Case Study - Ireland



Case Study - Hungary



Case Study - New Zealand



Conclusions

1. Strong containment policies are effective
2. State-level analysis of the US supports the use of such measures
3. Restrictions should not be loosened until infection rates are minimal
4. Governments must be proactive in implementing strict lockdowns
5. Policy effectiveness rests on the cooperation of the people

Friendly Reminder

- Abide by your government’s policies
- Don’t forget your masks
- Keep physical distance
- COVID-19 doesn’t know holidays!