

# Effect of Shelter-in-Place Order Against COVID-19 US State Case Rates

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# Research Problem

What is the effect of a statewide stay-at-home/shelter-in-place mandate on the COVID-19 case rate per 100,000 people in each state?



Research Problem

Key Variables

EDA

Models

Takeaways

# Most Important Variables

**Stay\_home variable:** a dummy variable indicating whether states implemented a stay-at-home order (1) or not (0) at any point before the data was collected.

Stay at home/ shelter in place
2020/4/4
2020/3/28
2020/3/31
0
2020/3/19
2020/3/26
0

```
mutate(stay_home = ifelse(home == 0,0,1))
```

```
d3 <- left_join(d2, restrict, by="state")
```

state <chr>	stay_home <dbl>	case_rate <dbl>	restriction <dbl>
Alabama	1	3870	1
Alaska	1	1960	1
Arizona	1	3381	1
Arkansas	0	3640	1
California	1	2308	1
Colorado	1	1791	1
Connecticut	0	1972	0
Delaware	1	2539	1
Florida	1	3682	1
Georgia	1	3392	1

Research Problem

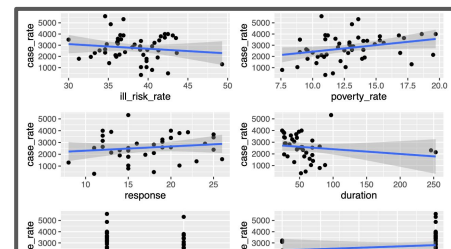
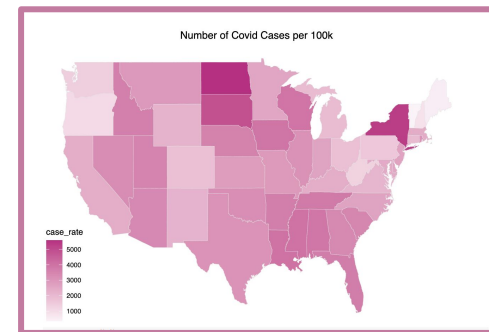
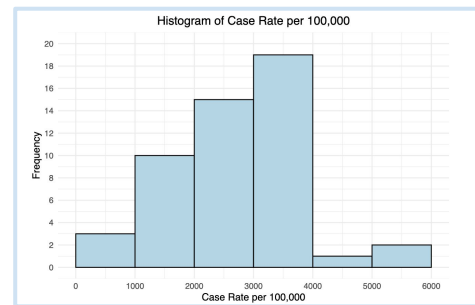
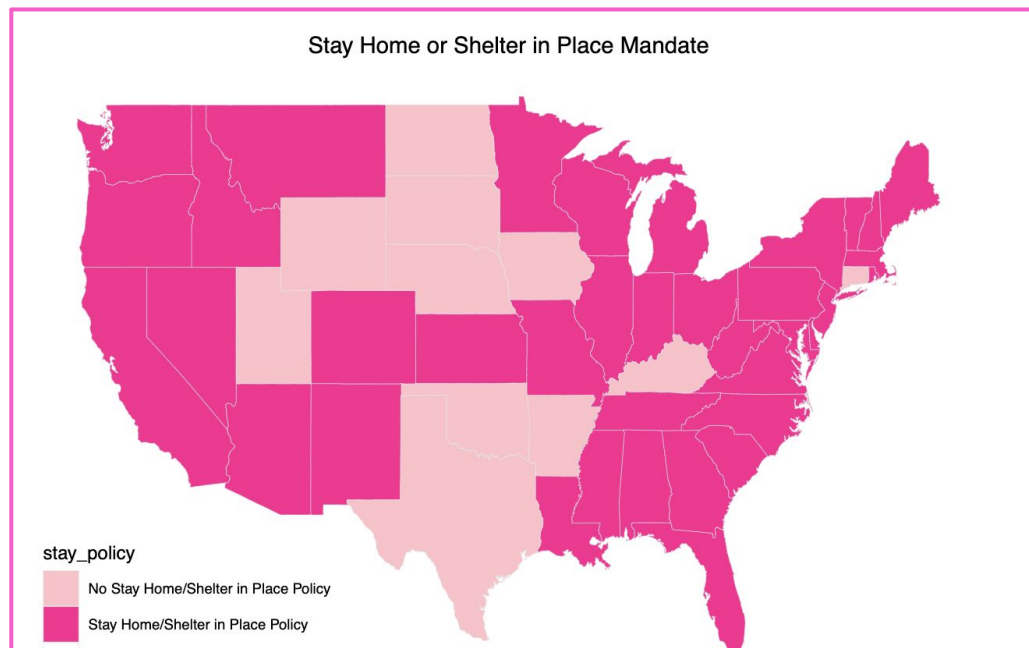
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# EDA Pictures/Plots



Research Problem

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# Models We Ran

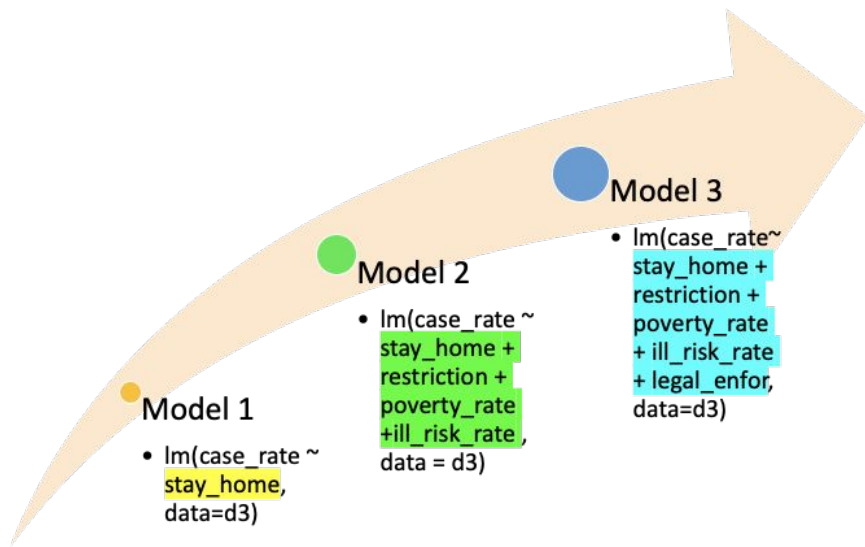


Table 1: Regression Results

	<i>Dependent variable:</i>		
	stay at home (1)	case_rate stay at home + more (2)	overfit (3)
stay_home	-868.089** (391.427)	-1,090.391** (435.240)	-1,057.922** (428.471)
restriction		1,216.833*** (469.691)	1,088.997** (462.642)
poverty_rate		235.289*** (83.345)	274.152*** (73.133)
ill_risk_rate		-133.680** (60.585)	-136.013** (54.733)
legal_enfor			809.071*** (302.328)
Constant	3,432.909*** (348.497)	4,604.844*** (1,668.844)	3,685.879** (1,571.909)
Observations	50	50	50
R <sup>2</sup>	0.100	0.389	0.478
Adjusted R <sup>2</sup>	0.082	0.335	0.418
Residual Std. Error	1,099.370 (df = 48)	935.323 (df = 45)	874.989 (df = 44)
F Statistic	5.350** (df = 1; 48)	7.176*** (df = 4; 45)	8.044*** (df = 5; 44)

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

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# Model Takeaways

## Limitation

- i.i.d
- no perfect collinearity
- linear conditional expectation
- homoskedastic errors
- normally distributed errors

## Omitted Variables Bias

- OVB 1: unemployment\_rate
- OVB 2: work\_mobility
- OVB 3: duration
- OVB 4: response
- OVB 5: medical\_percent

## Conclusion

- Implementing a stay at home/shelter in place policy will decrease a state's rate of COVID-19.

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**Takeaways**

THANK YOU

