Abstract - Impact of Government Intervention on COVID-19

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Hypothesis

Our research analyzes the role government intervention plays in containing the spread of the COVID-19 across countries. We believe that the government can bring an end to the spread of the virus through effective policies and lockdowns.

We explore

1) Which variables impact the number of cases?
2) What is the nature of this impact?

Data

Our data is a combination of variables determining coronavirus spread and government response and evaluation. We use the John Hopkins University Dataset to get total COVID-19 cases thus far for different countries. We also scrape Worldometer (worldometer.com) for population and testing data. Government evaluation variables are taken from the World Bank Dataset and consist of corruption level, government effectiveness and law enforcement ability. We also obtain the Stringency Index from the Oxford COVID 19 Government Response Tracker Data and the Human Freedom Index. The data may be skewed due to lack of available information for all countries. In the end, we analyze 130 countries for these variables.

Independent Variables: Government effectiveness, Human Freedom, Stringency Index (Lockdowns), Total Tests

Findings

Claim #1: There is evidence to suggest that total tests and human freedom increase total cases.
Evidence for #1: We ran a multiple regression to model the total cases from government effectiveness, stringency index, human freedom, and total tests. We found that the coefficients on total tests and human freedom are significant, with positive effect sizes of 0.41 (p=0.00) and 3,859.64 (p=0.037), respectively.

	Coefficient	P-Value
Government effectiveness	234.16	0.918
Stringency index	-7.82	0.913
Human Freedom	3,859.64	0.037
Total tests	0.41	0.000

Claim #2: There is no evidence to suggest that government effectiveness and stringency index decrease total cases.

Evidence #2: Using multiple regression we showed that stringency index and government effectiveness are not highly correlated with number of cases per million due to high p-values. The p-values values for human freedom and total tests were low however we further investigate the effect of all these variables on cases per million using one-tailed T-tests with a 5% level of significance. We also decided to explore controlling for total tests for the virus by binning countries into low, medium and high testing groups. We found from claim #1 that testing had a low p-value and assumed that controlling through binning would eliminate the extraneous effect of total testing when analyzing government variables.

Using the data from the test (given below), we cannot conclude that high stringency index (severe lockdowns) is associated with a lower number of cases per million (cannot reject the null, alternative hypothesis states cases decrease with increase in stringency). Similarly, we cannot conclude that high government effectiveness is associated with a lower number of cases per million (cannot reject the null, alternative hypothesis states cases decrease with increase in government effectiveness). However, there is evidence that at a low human freedom index is associated with a lower number of cases per million in the high testing group (reject null; alternative hypothesis states cases increase with increase in human freedom). This result should be taken with a grain of salt as this is only true in the high testing group. Furthermore, the binning of countries into groups may be skewed.

Testing Group	LOW			MEDIUM			HIGH		
	T-value	**T-Crit**	**Result**	**T-value**	**T-Crit**	**Result**	**T-value**	**T-Crit**	**Result**
Government effectiveness	-4.39	1.71	NR	-0.89	1.703	NR	-1.41	1.71	NR
Stringency Index	-0.17	1.76	NR	1.44	1.75	NR	-0.12	1.75	NR
Human Freedom	1.43	1.71	NR	1.55	1.69	NR	1.82	1.71	**R**