

Undergraduate Thesis Prospectus

Impact of COVID-19 Shutdowns on the Economy and Environment
(technical research project in Systems Engineering)

The Struggle for Safer Conditions
in US Prisons during the 2020 Pandemic
(sociotechnical research project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem

How has the COVID-19 pandemic influenced social movements worldwide?

The COVID-19 pandemic has had profound social and economic effects. Worldwide, 400 million people may fall into extreme poverty in 2020. In some cases, the pandemic has exacerbated stigma, discrimination, and hostility against marginalized communities (Rohwerder, 2020). Most of the world's population has no institutional protection from the pandemic's effects (Rohwerder, 2020). Global responses will have enduring legacies for the environment, for public health, and for social and economic equity (Worldometer, 2020; Gerstenfeld, 2020; Kasper & Marcoux, 2020).

Impact of COVID-19 Shutdowns on the Economy and Environment

How have the COVID-19 shutdowns reduced economic activity as well as contributed to the decrease in both atmospheric and water pollutants?

My Systems Engineering capstone project will be guided by Professor Venkatraman Lakshmi from the Department of Engineering Systems & Environment, and I will be working alongside Rachel Bigelow, Shivani Das, Zach Dedas, and Eric Jess.

Beginning in January 2020, countries across the globe began implementing various safety measures to slow the spread of COVID-19. Safety measures have run the gamut of restriction; physical distancing guidelines, proper hand washing practices, and the use of face masks are on the lower end of the restriction spectrum, while travel restrictions, business closures, and country-wide lockdowns are more stringent measures (Balmford & Annan, 2020). While policy responses have differed among governments across the globe, the economic strife has plagued countries regardless of their COVID response plan. Among drastic reductions in GDP and growth, unemployment has been widespread; an estimated 130 million full-time jobs were lost

worldwide in Q1, and an additional 175 million full-time jobs were lost in Q2 of this year (Meester & Ooijens, 2020). Global road transportation was down by 50% during Q1 as compared to Q1 of 2019, as well as a 75% decrease in commercial flight activity over the same time period (Sung & Monschauer, 2020). Despite the negative economic impact, coronavirus-related lockdowns have given the earth an opportunity to clean the atmosphere. After Q1, air quality index (AQI), which is an assessment of overall air quality, climbed to the ‘satisfactory’ range of 50-100 from its normal range of 100-200 (Arora & Bhaukhandi, 2020). In order for countries to emerge from the pandemic with strong economies and healthier environments, accurate conclusions from COVID’s impact, as well as various economic sectors’ impact on air quality, water quality, and general pollution must be offered to governments in order to effectively guide future policymaking.

The goal of our capstone project is to determine how government policy, lockdowns, and travel restrictions implemented during the COVID-19 outbreak have both slowed economic growth in transportation, manufacturing, and agriculture sectors, and in turn, impacted air quality and water quality. Our hope is that the conclusions and connections drawn between coronavirus related policies and their effect on economic growth and environmental health will help drive future decisions made by policymakers were another pandemic or similar global crisis to arise.

Extensive research regarding countries’ policy responses to the coronavirus, the economic impact of the virus, and the environmental changes from COVID-19 have been well documented; however, very few connections have been drawn between all three components: policy, the economy, and the environment. Oxford University has created a Coronavirus Government Response Tracker, that compiles data from over 180 countries to track and compare their policy response to the COVID-19 outbreak (University of Oxford, 2020). Federal agencies

including the Bureau of Economic Analysis and NASA have each performed their own analysis on the pandemic's impact on the economy and environment; the BEA has provided continuous updates on unemployment, GDP, and stimulus policies during the pandemic, while NASA has provided extensive air quality and greenhouse gas emission data (BEA, n.d.). Using public databases for economic activity, including transportation and road usage data, as well as NASA satellite sensor observations, my capstone team will use data analytics, statistical analysis, and spatial mapping to draw conclusion regarding the extent to which COVID response policies and restrictions have reduced the economy, and in turn affected air and water quality. At the end of our capstone research, we hope to be able to draw direct correlations between coronavirus-related policies and their economic and environmental impacts, empowering future policymakers to better understand the indirect effects of crisis related response policy.

The Struggle for Safer Conditions in US Prisons during the 2020 Pandemic

In the U.S., how have prison systems and inmate advocacies competed in response to the 2020 pandemic to influence the safety conditions in prisons?

Worldwide the United States ranks number one in both prisoners per capita and total prisoners (Wagner & Sawyer, 2020). Since March 2020, the COVID-19 pandemic has exacerbated the deficient healthcare of many US prisons (Amon, 2020). By October 30, the Federal Bureau of Prisons had recorded 17,000 coronavirus cases among inmates in federal prisons, including 129 deaths (BOP, n.d.). Advocates for prison reform including the Bail Project, Fair and Just Prosecution, and Youth Correctional Leaders for Justice have called for the early release of at-risk inmates and have demanded better medical care (Prison Policy Initiative, 2020). On the other hand, prison systems and spokespersons, including the Virginia DOC, the Connecticut DOC, and spokespeople for Louisiana's Angola Prison claim that inmates have

received ample care during the pandemic (Virginia DOC, 2020; Connecticut DOC, 2020; ProPublica, 2020).

Researchers have studied healthcare in U.S. prisons. Ginn (2012) found that prisoners' care needs are diverse and that many prisoners are in poor health. According to Vose (2020), the pandemic has exacerbated deficiencies in medical care in overcrowded and ill-equipped prisons. Some prison systems have resorted to early release to prevent virus transmission in prisons, but Reinhart and Chen (2020) caution that arrest and pretrial detention conditions can also transmit coronavirus. They found that in communities in which the frequency of transitions between jail and the community is high, infection rates are high; indeed such "jail-community cycling" was a better predictor of positive coronavirus cases than race or poverty. Wang et al. (2020) recommended means of preventing transmission among immobile populations in close living quarters, such as residents of prisons, nursing homes, and orphanages.

Advocacies for prisoners include Unlock the Box, Community Oriented Correctional Health Services, and the Sentencing Project. Jessica Sandoval, a strategist for the Unlock the Box, states that "prisons across the nation... have a legal, ethical and moral obligation to adopt and implement safe and effective strategies in response to COVID-19" (Unlock the Box, 2020). Dr. Homer Venters, the Senior Health and Justice Fellow for COCHS, claims "we have really no true idea of how bad the problem is because most places are not yet testing the way they should" (Urell, 2020). In September, Josh Rovner of the Sentencing Project warned that in juvenile detention centers: "The emergency is not over. More youth can be released, with a need to focus on youth of color" (Rovner, 2020). Echoing calls for release, an Alabama inmate pleaded for "help for sanitary purposes," and "help for a release mechanism" to prevent coronavirus transmission (Doherty, 2020). On the other hand, Massachusetts sheriffs and district attorneys

have united to oppose early release, condemning it as “short-sighted” and “likely, in the end, to result in substantial harm to the inmates themselves ... and the general public” (Martinez & Cotter, 2020). Ken Pastorick, a spokesperson for Louisiana’s Angola Prison, affirmed “we are proud of the job we have done managing the pandemic thus far, and the results bear out that our plan continues to be successful” (ProPublica, 2020). Harold Clarke, the VADOC Director, similarly stated, “we continue to do everything we can to fight the spread of this relentless pandemic,” referring to new weekly testing available in several facilities (Virginia DOC, 2020). Angel Quiros, the Interim Commissioner of Connecticut’s DOC, expressed his continued confidence in the “ability of the agency’s amazing staff to adapt to, and overcome any future challenges” (Connecticut DOC, 2020).

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