A Year Later: Were Lockdowns Necessary?

By: Connor Cassidy

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Introduction

It's been a little over a year since the first coronavirus lockdown took place on January 23, 2020, in Wuhan, China. Since then, almost every government has implemented some sort of guidelines or lockdown to deal with the outbreak in their respected country. This has led many to correlate the relationship between lockdown and decreasing the spread of coronavirus, but has it? In this paper, we'll be diving headfirst into this controversy to see if it has really been all that necessary in the first place and if we should consider this style of response the next time a global pandemic takes place.

What is the Coronavirus and Who is at Risk?

The Coronavirus or COVID-19 according to the Center for Disease Control and Prevention, is predominantly a respiratory illness that can affect other organs and is spread through droplets discharged from the nose or mouth (1). For most people they will experience mild symptoms but for individuals who have underlying health conditions for example, senior citizens, they are at an increased risk of severe infection. Other serious health problems — such as heart or lung conditions, weakened immune systems, obesity, or diabetes will also put individuals at risk as these health problems lead to compromised immune responses. This is similar to what is seen with other respiratory illnesses, such as influenza or the common cold (2).

What is particularly telling about these facts is a study done by Obesity Review found there appears to be a strong relationship between being an individual struggling with overweight or obesity and the risks of hospitalization and needing treatment in intensive care units (ICUs) to deal with COVID-19 (3). Additionally, the pandemic has occurred at a time when the prevalence of individuals with overweight/obesity is increasing in virtually all countries globally. In fact, almost all countries today have a prevalence of individuals with overweight/obesity greater than 20%, see figure 1.

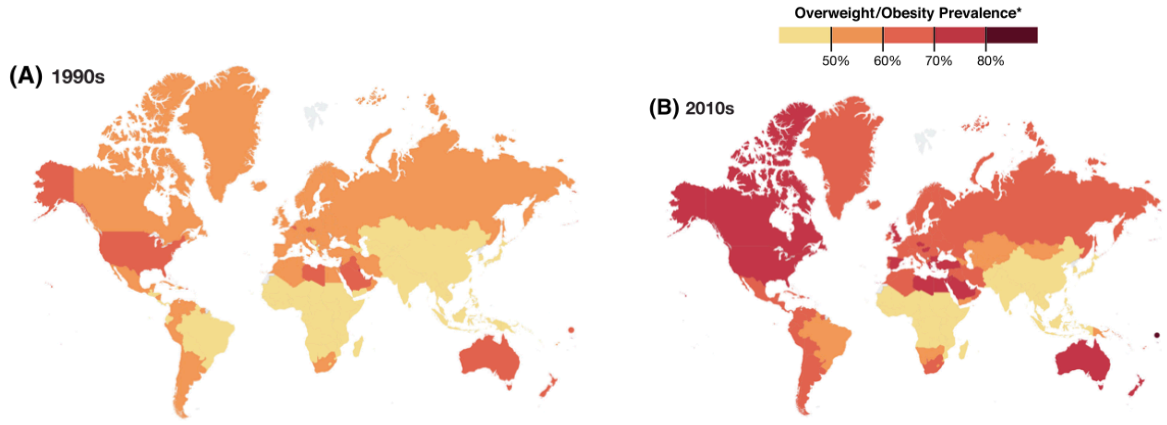
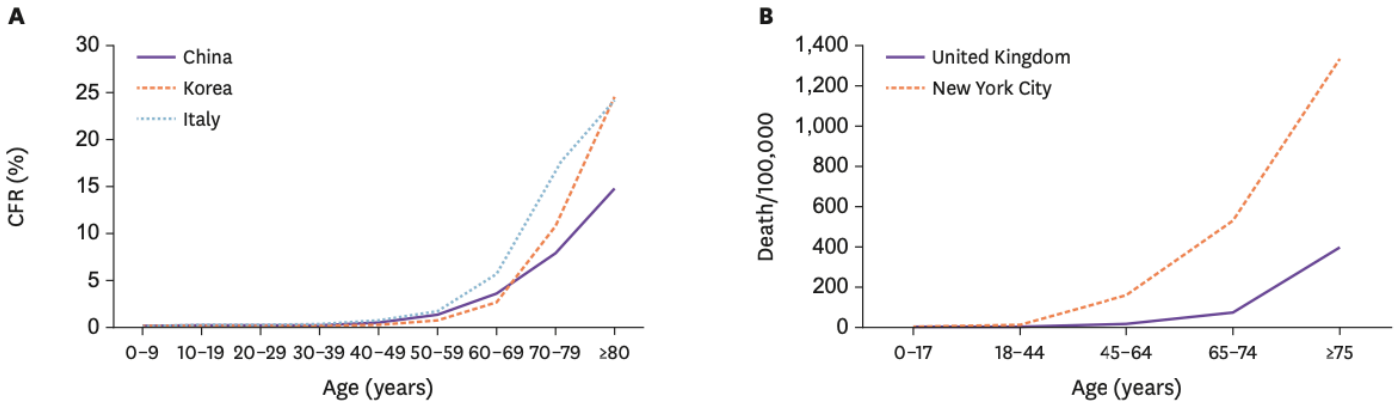


Figure 1: Prevalence of overweight and obesity based on 1990s and late 2010s weight and height data (3)

Furthermore, the same study shows an example of how a report on the characteristics of hospitalized patients for COVID-19 in New York City found 41.7% of those reported were obese while only accounting for 22% of the city's population. Among morbidly obese patients the odds of being admitted to ICU increased by 74% and most importantly the majority of studies submitted to Obesity Review showed that patients with obesity were more likely to have unfavorable outcomes with a 48% increase in deaths (3). The reason why I'm putting so much emphasis on body weight and the mortality rate of COVID-19 is that this won't be the last disease to affect humans and as obesity affects an increasing amount of the population, see figure 1, it will decrease the chance of survival among many individuals around the world as well as impacting the effectiveness of how governments respond to these events.

Finally, we'll look at how age and COVID-19 are related. An article published by the Korean Society of Infectious Diseases (4) showed that the overall case fatality rate or CFR in the country was 2.37% but was significantly higher in patients 70-79 (10.9%) and even higher for patients 80 and older (26.6%). The publication also reviewed an analysis of over 44,000 cases in China that showed overall CFR was 2.3% but again a massive percentage increase for patients 70-79 (8%) and in 80 and older (14.8%). In a report released by the Higher Institute of Health of Italy, the overall CFR on March 26, 2020, was 9.2%, which was four times higher than that in Korea or China; however, the pattern of increasing fatality with age was similar to that in Korea and China. The CFR was less than 1% in the age group of 50 years or less and rapidly increased in the age group of 60 and older reaching 16.9% and 24.4% in the age group of 70 – 79 years and 80 years and above, respectively. In terms of death per 100,000 individuals in the population (as of May 11, 2020, data from the New York City Department of Health and Mental Hygiene, and as of May 8, 2020, data from the Office for National Statistics of United Kingdom), clear patterns of age-based exponential increase in fatality has been observed. Included in figure 2 are charts from the same publication showing just how significant age plays a role in the fatality rate of COVID-19 as well as for the influenza pandemic from 1911-1918.



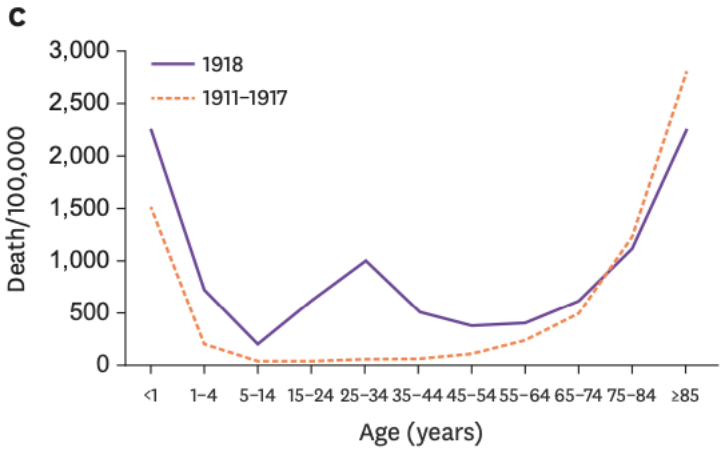


Figure 2: (A) Case Fatality Rate or CFR of COVID-19 in China, Korea, and Italy, (B) Death per 100,000 from COVID-19 in New York City and the United Kingdom, (C) Death per 100,000 from influenza and pneumonia in interpandemic years (dashed line 1911 - 1917) and pandemic year (solid line 1918) in the United Sates.

How Have Governments Responded to the Pandemic?

This by far has been the most controversial topic of the whole pandemic. Government response has ranged from guidance by officials to outright banning restriction of movement without approval like in Paris, France where in March 2020 you weren't allowed to leave your home unless you were given permission in the form of an issued slip that allowed you to travel a maximum of a single kilometer (See Figure 3 for a more complete list of responses). Many government officials were left with no choice but to follow what they believed and were told was the only way to deal with a contagious virus. These measures are what is known in the epidemiologist community as a non-pharmaceutical intervention or NPI and their results have varied in effectiveness. This is partly due because it's common to use multiple NPIs at a time making it difficult to measure the success of a single one and when you add in the "sunk cost fallacy" which happens when a response is a catastrophe but to admit it would be to admit that all the lives lost had been lost pointlessly, you get a less than optimal outcome. More importantly, people's own behavior decides what they will do and can grossly overestimate the efficacy of any intervention.

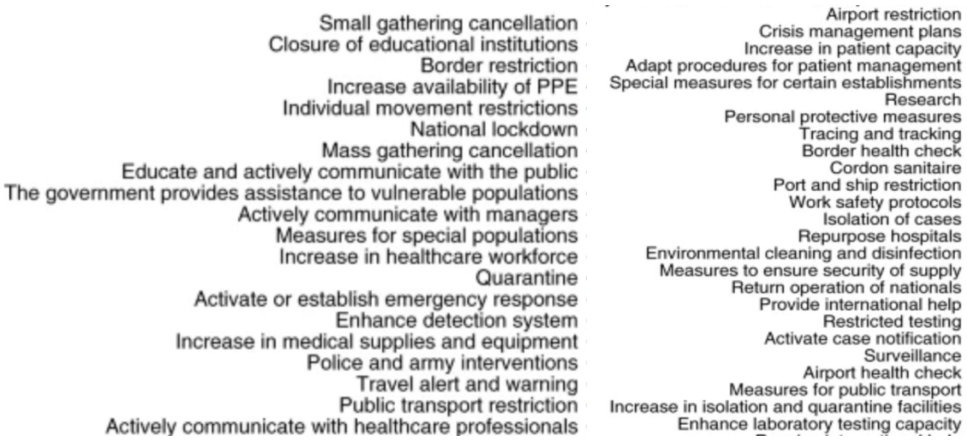
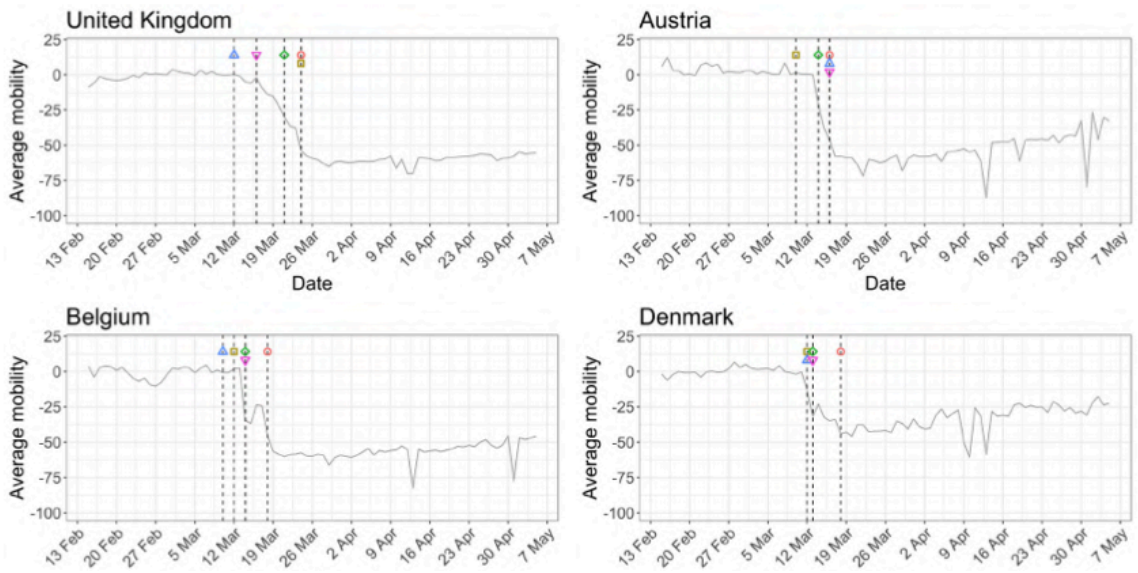


Figure 3: Complete list of Government Responses to the COVID-19 Pandemic

Effects of Non-Pharmaceutical Interventions on COVID-19

This is where things can get a little complicated. Studies show that NPIs can slow the spread of the virus, for example, the Imperial College London in May 2020 said government lockdowns reduced the spread by 75-87% and saved 2.8-3.5 million lives (5), and this is what most governments in Europe based their decision to continue the implementation of national lockdowns on, but peer review of the same models say they grossly overestimated the effectiveness and underestimated people's own decision to reduce their mobility (6).

Vincent Chin and others critique of the Imperial College London's publication pointed out that their model which only considered when an NPI was implemented and the resulting increase or decrease of coronavirus cases and deaths to infer success or failure and didn't consider changes in human behavior, clustered contact structures and/or pre-existing immunity was a gross mistake. They used the same data to show how mobility was already decreasing well before lockdowns were instituted and the resulting economic and social damage was completely unnecessary (See Figure 4).



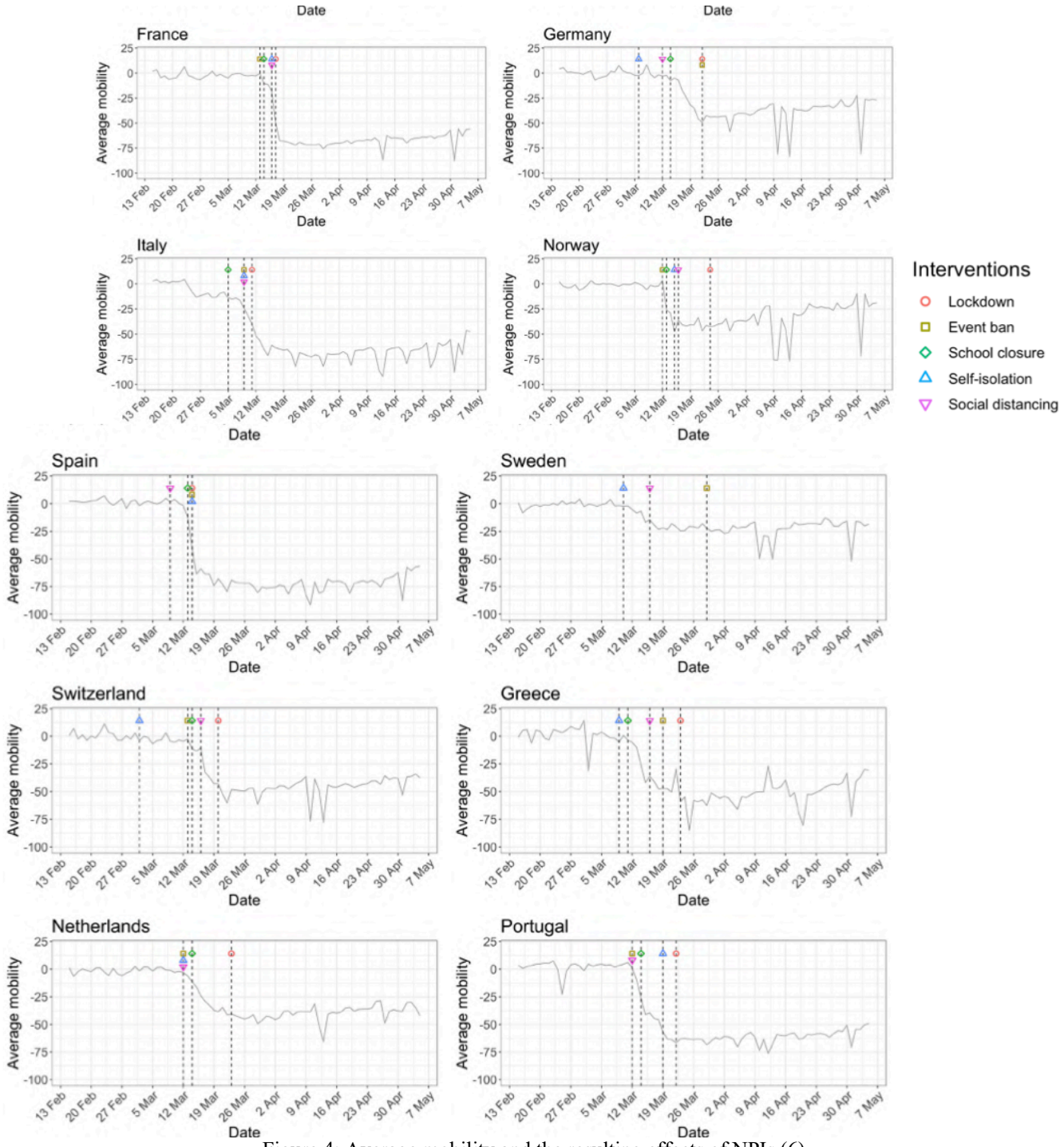


Figure 4: Average mobility and the resulting effects of NPIs (6)

As you can see mobility was already on the decline, which reduced the spread of the coronavirus, making the lockdowns completely unnecessary. Also, research done by the PLOS Medicine Staff showed that hand washing, mask-wearing, and social distancing can produce the same results without the need for a national lockdown (7). They continued by even reporting that their models show if 90% of a country's population adapt handwashing and social distancing that

is 25% effective, it would not cause a serious outbreak. All in all, we can conclude that the benefits NPIs, like lockdowns, instituted by governments were negligible.

Germany: A Case Study

Now let's evaluate the lockdowns in Germany to see how the "swift" government intervention was superfluous. To understand why the German government made such an erroneous error we must first comprehend how they were collecting data and why that data was inadequate. The collected data was of when an infection date was reported and then creating what they described as a "reporting delay" to estimate a parameter to when an individual was infected. The problem here is that the intervals between dates of actual infection, diagnostic testing, and reporting differ across people in the country. In fact, many suspected people were tested even before symptom onset, whereas true patients were at times tested more than 20 days after symptom onset (8). Therefore, it's not possible to infer anything meaningful from modeling the spread of infections solely using reporting dates.

After the first extensive lockdown in Germany on March 23, 2020, the German Federal Health Agency, Robert Koch Institute, or RKI published a more comprehensive approach. This model was not based on reporting dates, instead on symptom onset, or incident cases, and gave much more accurate infection dates but showed just how late the government was at reacting and how unnecessary the lockdowns were. Shown in figure 5 are the growth rate of incident cases and its peak on March 5th, 18 days before the lockdown, and a rapid decline thereafter.

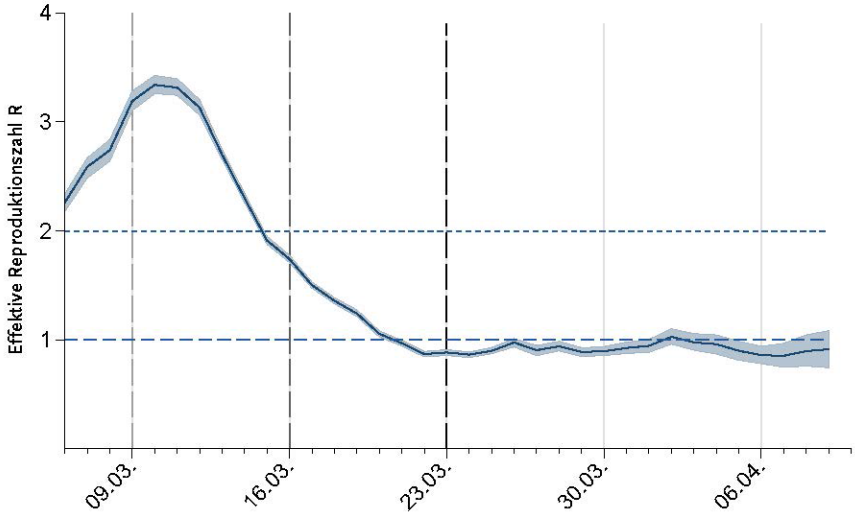


Figure 5: Growth Rate of Incident Cases on Germany (8)

Therefore, it's obvious that the spread of the virus was already in decline before the first intervention. And it was even negative before the extensive lockdown. Figure 6 shows the effective growth rate started declining on March 7th and even became negative on March 17th, six days before the lockdown.

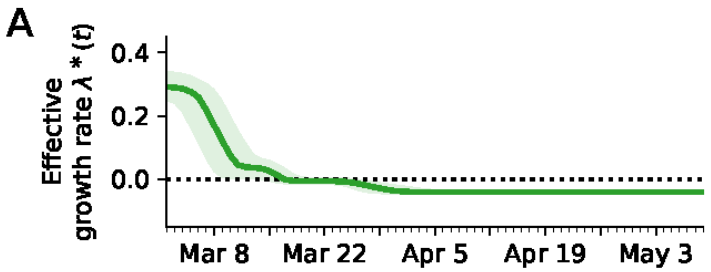


Figure 6: Effective growth rate of infections in Germany (8)

Now that we know the lockdowns and subsequent economic catastrophe could have been avoided, let's compare this to the neighboring country of Sweden that didn't institute a restrictive government lockdown. Figure 7 shows COVID-19 deaths per million in the two countries exhibiting how similar the outcomes were but how different the governments responded.

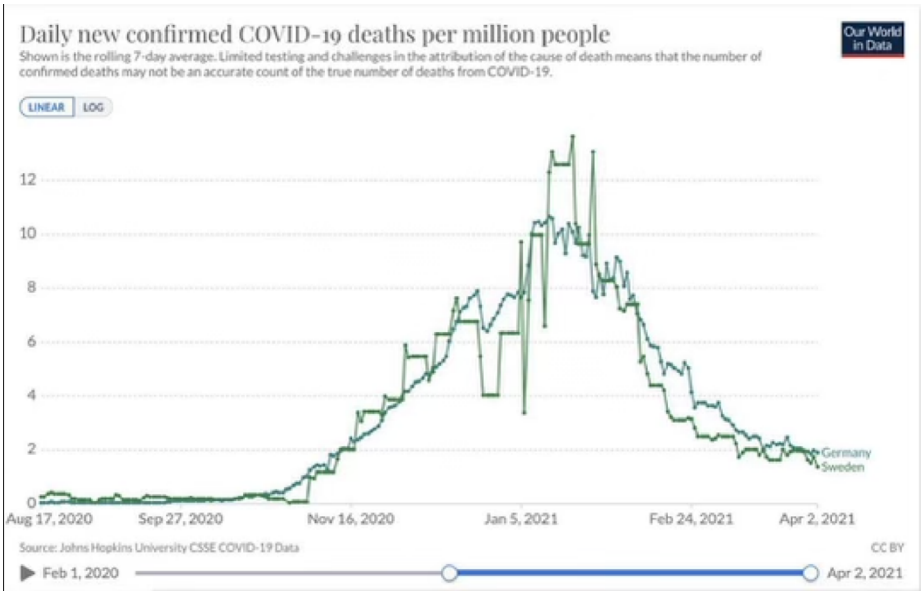


Figure 7: Daily new confirmed COVID-19 deaths per million people in Germany (Blue) and Sweden (Green) (9)

Unintended Consequences of National Lockdowns

What every government official tends to forget about is the unintended consequences and opportunity costs of their legislation and this pandemic has been no different. The repercussions of these lockdowns will be felt for decades to come as depression, anxiety, and domestic violence are all up from a year ago, not to mention the economic fallout and the effect on students learning development.

The United States Census Bureau assessed the prevalence of anxiety and depressive symptoms in 2019 and during the 2020 COVID-19 pandemic and found that of the over 330,000 adults aged 18 to 64 that were contacted they were more than three times more likely to screen

	2019	April 23–May 4, 2020
Anxiety	8.2%	30.8%
Depression	6.6%	23.5%
One or both	11.0%	35.9%

positive for anxiety disorder, depressive disorder, or both, with more than one out of three screening positive for one or both in the 2020 samples (10), figure 8 on the right. Even though there has been a significant increase in depression and anxiety, a study done on 21 developed countries found that there has been no increase in suicide rates (11).

The picture for domestic violence though is less than rosy. The New England Journal of Medicine coined it a pandemic within a pandemic because for some the stay-at-home orders meant that they were ordered by their own government to be trapped with their abusers. One in 4 women and one in 10 men experience intimate partner violence or IPV, and violence can take various forms: it can be physical, emotional, sexual, or psychological (12). People of all races, cultures, genders, sexual orientations, socioeconomic classes, and religions experience IPV. However, such violence has a disproportionate effect on communities of color and other marginalized groups. Economic instability, unsafe housing, neighborhood violence, and lack of safe and stable childcare and social support can worsen already tenuous situations. Economic independence is a critical factor in violence prevention. For many people who experience IPV, the financial entanglement with an abusive partner is too convoluted to sever without an alternative source of economic support. The pandemic has exacerbated financial entanglement by causing increased job loss and unemployment, particularly among women of color, immigrants, and workers without a college education (12).

It's been particularly hard on children, as officials claim the coronavirus can seriously affect them with scientific evidence showing otherwise (8), we won't truly know how much of an impact this will have for years to come but the evidence gathered by Brown Center Chalkboard shows an already bleak outcome. When comparing students' median percentile rank for fall 2020 to those for fall 2019, reading seems to have been unaffected in grades 3-8 (13) but for math, the news is worrying. Figure 9 below shows the median percentile rank in math by grade level in fall 2019 and fall 2020. As the figure indicates, the math achievement of students in 2020 was about 5 to 10 percentile points lower compared to same-grade students the prior year (13).

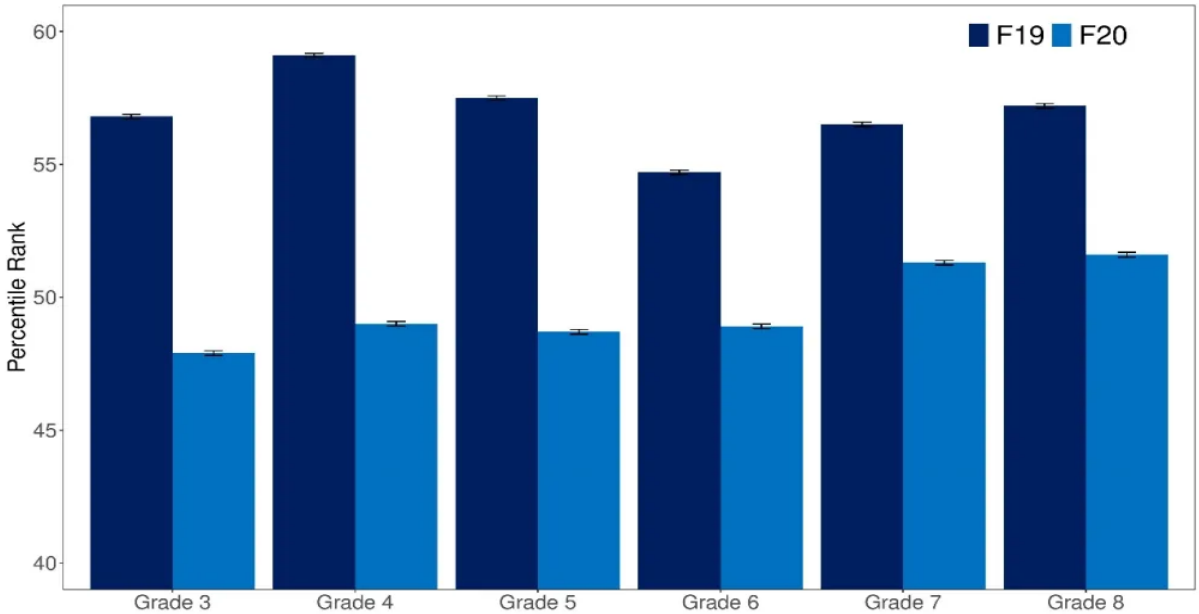


Figure 9: Each bar represents the median percentile rank in a given grade/term.

As you can see students have significantly fallen behind in one of the most important areas in school and the Brown Center Chalkboard said, “we are only scratching the surface in quantifying the short-term and long-term academic and non-academic impacts of COVID-19.” Implying this could just be the tip of the iceberg.

Finally, we’ll look at the economic fallout in the form of GDP and labor participation from the pandemic. In the United States, Real GDP was almost 2 trillion lower than Potential GDP (14, Figure 10), with 44.41% of GDP coming in the form of wages (15, Figure 11) the pandemic cost 152,523 million working Americans over US $862 billion in lost wages, about US $5647 each in quarter two of 2020 alone. Labor participation has also hit its lowest in the US since World War 2 (16, Figure 12). This shows that not only were Americans losing thousands of dollars a month in lost wages, but more workers than ever have left the labor force since the rise of Nazi Germany.

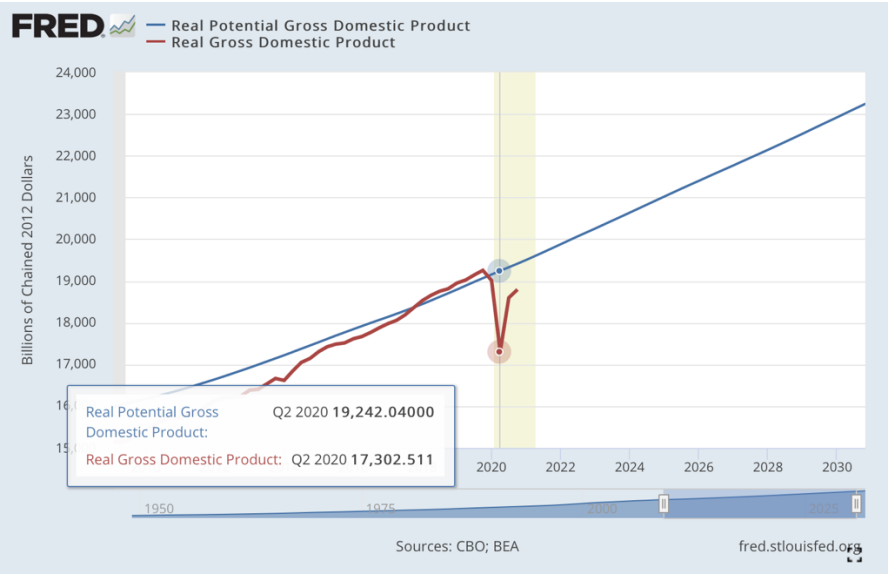


Figure 10: Potential Real GDP vs Real GDP in the US (14)

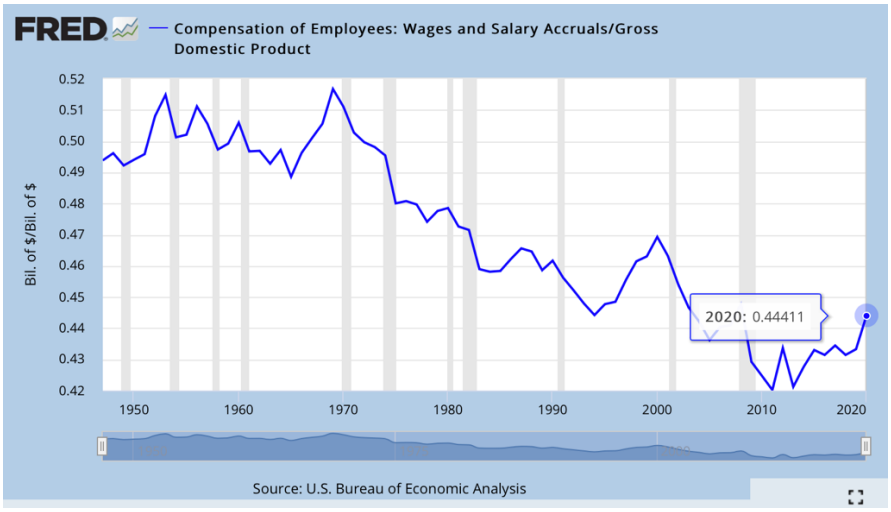


Figure 11: Percentage of GDP paid to employees in the form of wages and salary (15)

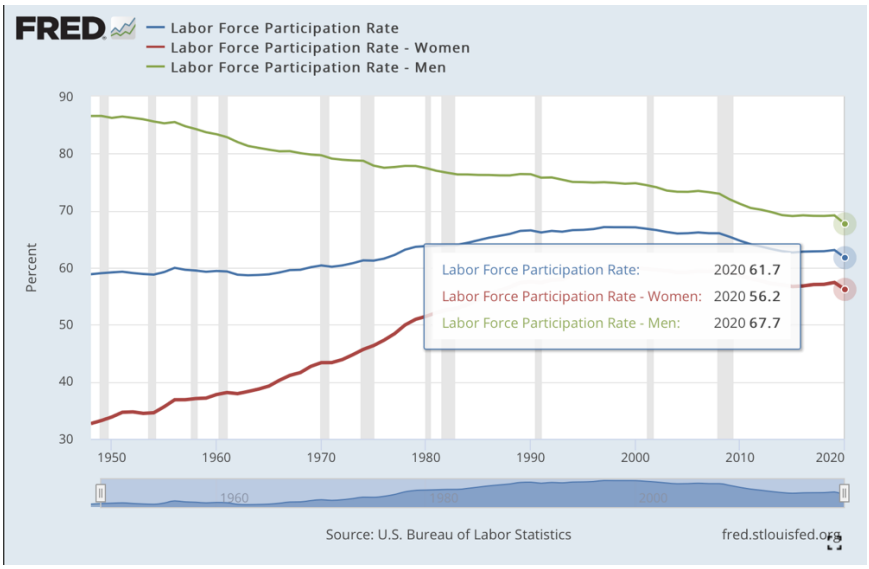


Figure 12: Labor Force Participation Total (Blue), for Men (Green), and for women (Red) (16)

For Europe, potential GDP could not be found but using 2019 Real GDP for the EU from the World Bank at US $15.626 Trillion (17, Figure 13), the lost GDP of 2020 (18, Figure 14), and using Eurostat's report of 47.5% of GDP paid to employees in the form of wages and salary (19, Figure 15), I calculated a loss of US $1.15 trillion in GDP in 2020 with an almost US $550 billion in lost wages. As for labor participation, Europe saw a steep decline at the beginning of 2020 with a decent recovery but now the trajectory is pointing to a further decline (20, Figure 16)

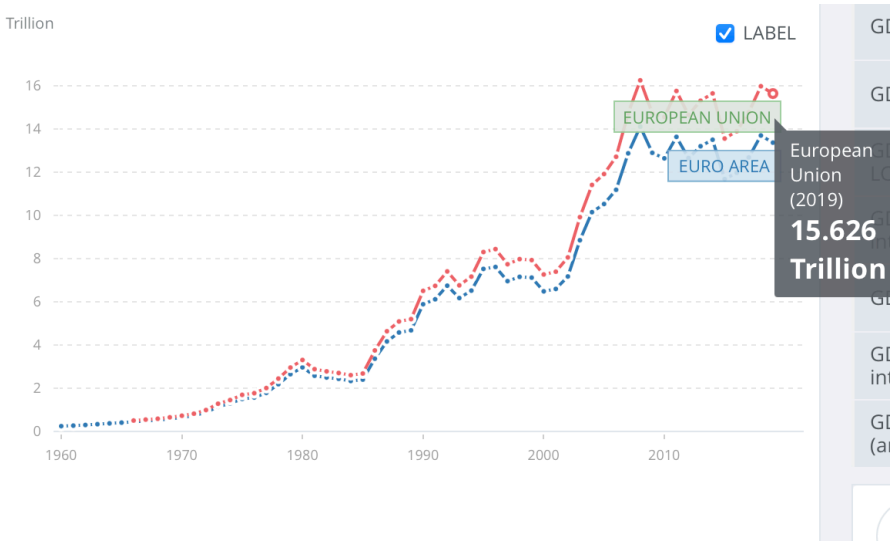


Figure 13: European Union Real GDP from the World Bank (17)

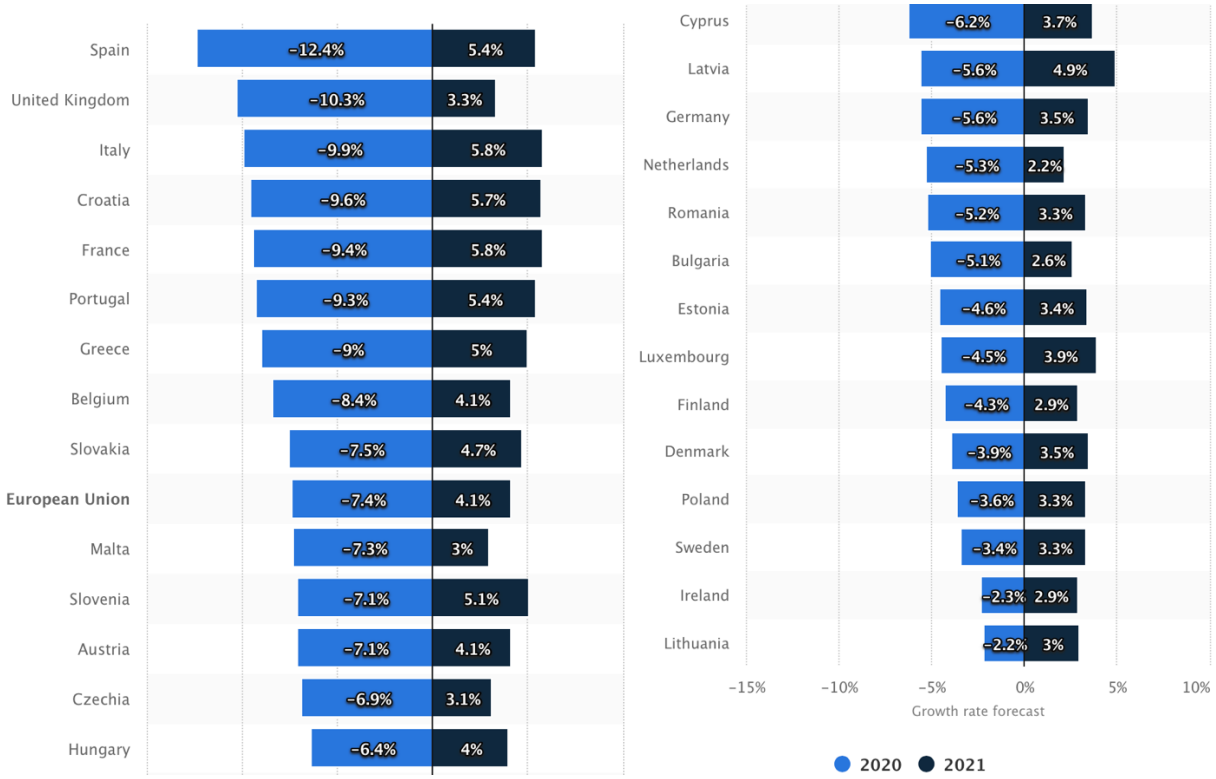


Figure 14: Lost GDP throughout the European Union with the average being (-7.4%) (18)

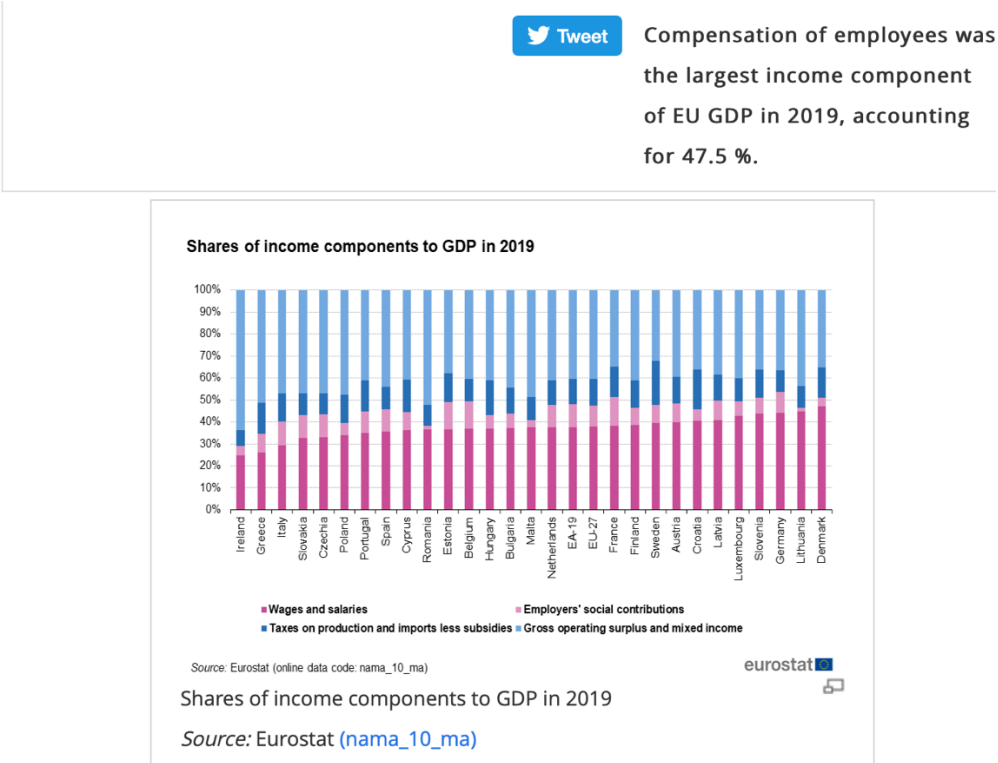


Figure 15: Average Compensation of Employees throughout the European Union (19)

Figure 16: Labor Participation Rate throughout the European Union (20)

Conclusion

Throughout this paper, we were questioning the notion of if the lockdowns imposed by governments around the world were in any capacity all that necessary. From describing what the coronavirus is and whom it affects the most to the high rates of depression and anxiety caused by the government restrictions, I hope to have successfully changed your mind to at least question the belief that we truly needed them. From lost wages to children falling behind in school to one in four women being trapped with their abusers we should deeply reconsider an outright lockdown.

In countries around the world, there has been anti-lockdown protests due to the incredibly restrictive nature of the policy. Like I pointed out in Germany: A Case Study, some governments were too late to act, and instituting a lockdown only created social and economic harm. As we move forward with the vaccine rollout we should look back and realize how important it is to get disease control policy right because getting it wrong, like we did this pandemic, could be an even worse catastrophe the next time around.

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