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Measuring the Effectivity of South Korea's COVID-19 Policy Responses

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Abstract: *This research paper measured the efficiency rate of South Korea's COVID-19 policies. It is imperative to measure the effectiveness of the government's pandemic response policies as it is important to understand if the promulgated responses can cushion the economy from the impact of the pandemic. This paper argues that South Korea's COVID-19 policies were efficient at the beginning but ended up being inefficient. To determine this information, the paper used data of efficiency rate (Et) and stringency index (OxCGRT). The efficiency of South Korea's COVID-19 policies was found by using the efficiency rate (Et) after the implementation of each social distancing policy. The value Et was found using the formula that used the number of COVID-19 cases on each policy. If the efficiency rate (Et) is over 1, it means the policy is inefficient. If the number is close to 0, then it is efficient.*

The results show that South Korea's COVID-19 policy was efficient during the first two policies, but the efficiency rate slowly increased from the third policy hitting peak at the policy, "Step-by-step recovery". In conclusion, the results show that it is hard to sustain the momentum and reduce the number of confirmed cases due to some reasons such as economic failure and citizen's stress level by social distancing. These reasons led the government to lower the stringency which caused the policy to be inefficient.

Keywords: COVID-19, Efficiency, Government, Policies, Response

I. Introduction

This research paper focuses on the effectiveness of South Korea's COVID-19 policy responses based on the number of confirmed cases in the whole nation, from the beginning of the "Social Distancing" policy until January 21, 2021. When COVID-19 was first identified, South Korea was considered as one of the countries that encountered COVID-19 early as it had confirmed cases earlier than most countries. Consequently, the Korean government promulgated a policy called "Social Distancing", but the number of cases started to increase more quickly than the cases in any other country, reaching the peak of 805 COVID-19 cases on March 1. South Korea introduced seven different types of "Social Distancing" policies, after that, the government lifted the "Social Distancing" policy and changed it to "Step-by-step recovery", which aimed to restore the normalcy of life pre- COVID-19.

The policies are listed and explained below:

Fortified Social Distancing:

The Korean government strengthened the "Social Distancing" policy due to the first huge covid pandemic that happened by a pseudo-religion called Shincheonji. The 31st confirmed case of COVID-19 was a member of Shincheonji, and even though she had symptoms, she joined a church two times, which had about 1,000 other people in it. The quarantine rules, such as wearing masks, were not followed and it caused the first large spread of COVID-19. To stop this quick spread of COVID-19, the Korean government strengthened the Social Distancing law by unilaterally closing places such as churches, gyms, and clubs, until April 5th, 2020.

The first prohibition of gathering people:

Concerns about group infection increased as two female employees working at a KTV bar in Yeoksam-dong, Gangnam-gu, were known to have been infected with COVID-19. Hence, the Seoul Metropolitan Government decided to ban gatherings at 422 KTV bars, including room salons, and clubs until the 19th, the period of social distancing set by the government.

Easing some actions handed down by the government due to the COVID-19:

Through a survey, opinions were raised that it was premature to stop social distancing and move to daily quarantine and "A New Routine Distancing in Daily life" because of the current situation.

A New Routine Distancing in Daily life:

In the regular briefing on May 3, the Korean Government announced that starting from May 6th, 2020, the existing social distancing would end on May 6, and "A New Routine Distancing in Daily life" would be implemented. Detailed guidelines were prepared as follows.

3 levels of Social Distancing:

On June 28th, 2020, Koreans were confused about the different types of social distancing such as "A New Routine Distancing in Daily Life" and "Fortified Social Distancing. Hence, the Central Disaster and Safety Countermeasures Headquarters decided to unify the name of the different types of distancing into just "Social Distancing". Based on the transmission of COVID-19, specific levels of Social Distancing were decided.

5 levels of Social Distancing:

Since the vaccine for COVID-19 was not developed yet, "Social Distancing" was the foremost way to curb the spread of COVID-19. The government has applied different stringencies of social distancing, depending on the spread of infection. On June 28, the social distancing system was reorganized into three levels, and the transition standards and implementation plans were presented for each stage. Considering the short-term and long-term social and economic costs of social distancing, many experts proposed setting an acceptable risk according to the medical system's capacity and aimed to control the spread of COVID-19 under it. The government decided to change the levels, which might be confusing, so instead of using levels 1 to 5, they decided to use 1.5 and 2.5 instead of 4 and 5.

4 levels of Social Distancing:

Social distancing was reorganized to four levels, as it was pointed out that the previous five-level social distancing was not effective because it was too specified

Step-by-step recovery:

For the past two years, the South Korean government has experienced the COVID-19 pandemic without border blockade or regional blockade, only utilizing 3T (Test, Trace, Quarantine/Treat) and social distancing adjustments to continuously suppress the occurrence of confirmed cases. Due to this, the citizen's stress level and economic losses were maximized, but on the other side, South Korea quickly hit a 70% vaccination rate and the government decided that it is time to restore daily life before COVID-19.

Hence this paper analyzed the relationship between the efficiency measure and the stringiness of government response, for each of the eight social distancing policies.

Data Collection -

The official site for COVID-19 created by the South Korean government provides data on the daily cases by date through its COVID-19 Tracker web page, and the numerical data of confirmed cases in this research paper are based on this website. Since this research paper measures the effectiveness of South Korea's COVID-19 policy responses, it is also related to the stringency index that the website (ourworldindata.org) provides. The stringency index data has been collected by achieving the values of the Government Stringency Index (OxCGRT) between March 22, 2020, and January 21, 2022, and comparing these index values to the Et for South Korea's COVID-19 cases. There are a total of seven types of social distancing and one step-by-step recovery, and each policy's efficiency using Et will be measured using the equation that will be explained later.

For each policy, this research paper collected the number of confirmed cases to find out whether the policy is efficient or not. Seven dates of major policies have been chosen for the sample data, which are the last dates when those policies ended since it shows why the policies have been changed. This research paper also collected numeric data from OxCGRT to determine the stringency index values and compare these values to efficiency rate to find out if the values of efficiency rate and OxCGRT are related or not.

Statistical Analysis -

This research paper measured the efficiency of each policy the South Korean government has promulgated using E_t on the efficiency measuring equation. It also used the efficiency of the specific policy (E_t) as a means of measuring transmissibility .this represents the difference between the number of confirmed cases on date t to the average number of COVID-19 confirmed cases between 7 to 13 days before the date t If the value of E_t gets higher than 1, it is not efficient, and if the value of E_t gets near to 0 and lower than 1, it is efficient (This is the range of value t' $\{t' \mid 0 \leq t' < \infty\}$).

The equation for finding out the efficiency of the specific policy is shown below:

$$E_t = \frac{N_t}{\frac{1}{7} \cdot \sum_{k=7}^{13} N_{t-k}}$$

- t The specific date to calculate efficiency. (As an example, January 21 will be written as t_{21})
- N_t The number of COVID-19 confirmed cases on the date t
- $\frac{1}{7} \cdot \sum_{k=7}^{13} N_{t-k}$ The average number of COVID-19 confirmed cases between 7 to 13 days.

By dividing $\frac{1}{7} \cdot \sum_{k=7}^{13} N_{t-k}$ to N_t this means that dividing the number of COVID-19 confirmed cases on the date t to the average number of COVID-19 confirmed cases between 7 to 13 days before the date t This equation will give a value that is in this domain of $\{t' \mid 0 \leq t' < \infty\}$, and if we multiply this to 100, it will give the percentage of COVID-19 cases either increasing or decreasing compared to the average number of cases between 7 to 13 days before the date t As the value of E_t gets further away from 1 higher, this means that the number of cases has increased, so it shows it is not efficient. As the value of E_t gets near to 0 and lower than 1, this means that the number of cases has decreased, so it shows that it is efficient. For each individual policy that is measured with this equation, t' was based on the last date that each policy ended.

II. Results

First, to find out that this equation is a real-working formula, I measured the efficiency of the "Step-by-step recovery" policy, putting t as of January 21, 2022 ("Step-by-step recovery" is still ongoing, so the date is based on the written date).

$E_{21} = N_{21} / \frac{1}{7} \cdot \sum_{k=7}^{13} N_{21-k}$

≈ 2.1

When the numbers are plugged in, the value ends up with the number 2.1. The value 2.1 means that the number of daily COVID-19 cases increased about 210% on January 21, 2022, compared to the week before. This means that the policy currently in effect on January 21, 2022, is not that really efficient, since the number of daily cases is two times larger than the previous week. The policy that was in effect during this date is "step-by-step recovery", and this proves that this policy really does not help reduce the number of COVID-19 cases. So by using this formula, the efficiency rate for each policy looks like this in the graph.

Figure 1:

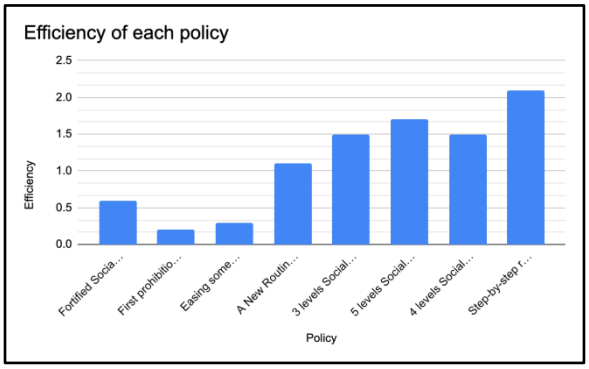
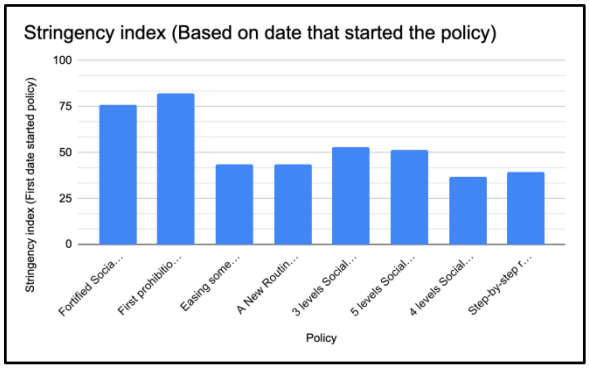


Figure 2:



III. Discussion

Figure 1 graph represents the efficiency of each policy. When the number is lower, it shows efficiency. We can notice that the policy was getting more efficient until the "First prohibition of gathering people ", but starting from the policy "Easing some……due to the COVID-19", the value of efficiency started to increase slowly, the policy started to get inefficient, and it hits its peak on the "Step-by-step recovery" policy. Looking at these changes of efficiency, these statistics are well-connected to the stringency index.

In contrast, looking at figure 2, the value in the stringency index is about 70 to 85 during the first two policies, and it gets lower to about 40 to 55 when the third policy begins until the "Step-by-step recovery".

Overall, we can say that those two figures are related. These figures show that when the value of the stringency index gets lower, the policy is usually inefficient. So it proves that policies are likely to reduce the cases by restricting the activity of citizens, but there are limitations of strictness, which caused the policy to change inefficiently.

IV. Conclusion

This paper suggests that South Korea's COVID-19 Policy Responses directly reduced the number of COVID-19 confirmed cases until about the third policy of the Social Distancing, but in the end, the number of cases increased. The cases could have been reduced if the stringency of the third policy continued. However the stringency decreased by about 30 in the stringency index (OxCGRT) and the efficiency rate started to increase, which is a sign that the policy is inefficient.

Even though the policy became inefficient, people should still consider the specific reasons that caused the loss in strictness of the policy. Complaints from citizens and the economic losses from many self-employed citizens caused the government to change policies less strictly.

The biggest change in strictness (30) in the stringency index (OxCGRT) was when the second social distancing policy (The first prohibition of gathering people) changed to a third social distancing policy (Easing some actions handed down by the government due to the COVID-19). The reason for the change in strictness is that the social distancing policies were accumulating people's motivation to work, so the government decided to ease some actions in social distancing policiees.

However, the fact that the policy became inefficient caused a considerable increase in the number of COVID-19 cases. From the beginning of the third policy, the efficiency rate slowly started to increase, which hit the peak at the current policy, "Step-by-step recovery" as shown in figure 1.

Overall the South Korean government's policy has been successful and efficient at the beginning, but some economic losses and complaints from citizens about strictness caused the government to restore daily life before the pandemic. Even though Korean government policies could not suppress the increase in COVID-19 cases, there may be reasons, outside the scope of this research, behind why the government could not create the policies strictly, hence, the policy became inefficient in the end.

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