Trusted Institutions and Policy Compliance: Evidence from COVID-19 Mobility Patterns in Korea*

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Abstract

This study examines the role of trusted institutions and political orientation in people's tendency to comply with COVID-19-related preventive measures. Using data on public transportation mobility and political orientation in the Seoul metropolitan area, we show that political messages on quarantine success downplayed the severity of the virus and, thus, hindered policy compliance during the major waves of COVID-19 in 2020 – 2021. Individuals with high institutional trust align their mobility behavior with the government's messaging, feeling safe and engaging more in social activities. Additional channels come from the area's occupation and industry classifications, mainly through remote work availability.

Keywords: political orientation; political message; mobility; social distancing; policy compliance; COVID-19

JEL codes: I18, O18, J08, R11, D72

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1. INTRODUCTION

Since the original outbreak of COVID-19 in early 2020, multiple health policies on social distancing and mobility restrictions have been implemented to effectively reduce mortality and the burden imposed by the pandemic on healthcare systems worldwide. While the effectiveness of such restrictive measures depends on the collective compliance of individuals, complying with containment measures requires heavy personal social responsibility. Persistent and common actions through shared beliefs are crucial to overcoming pandemics and preventing the free-rider problem. Previous studies on major pandemics (e.g., SARS, MERS, H1N1 influenza, and COVID-19) have suggested that diverse factors, including education level (Taylor et al., 2009), gender (Galasso et al., 2020), income level (Bodas & Peleg, 2020; Chiou & Tucker, 2020; Coven & Gupta 2020;), civil capital (Barrios et al., 2021), and political partisanship (Barrios et al., 2020), heavily influence an individual's level of compliance. Among the multiple channels, the role of governments in providing reliable information on virus specificity and containment has been found to be crucial (Van Der Weerd et al., 2011). Previous research has suggested that people tend to depend heavily on instructions and preventive policies from authorities when facing widespread uncertainty in a pandemic (Briscese et al., 2020; Marien & Hooghe, 2011; Vaughan & Tinker, 2009). Thus, effective public communication should be provided at the right time and place in accordance with the prevailing situation surrounding the pandemic to achieve positive public health outcomes (Quinn et al., 2013).

However, containment measures have not always been aligned with political messages. Governments in advanced countries have continuously advertised their success in containing the pandemic and how safe it was for citizens to maintain essential economic and consumption activities (Garrett, 2020). However, the positive signals provided by the government were often mismatched with the real-life situation surrounding the pandemic and existing containment policies, where COVID-19 infection rates soared shortly after the government released messages of quarantine success to the public. Naturally, the trust that individuals have in these institutions may be questioned, specifically whether they place greater store in the government's messages compared to the scientific status quo in their decisions to comply with containment measures. Specifically, does institutional trust influence people's decisions to comply with public policies due to different responses toward the ambient public messages promoting success in overcoming the pandemic?

This study examines the impacts of political orientation toward the government on the level of compliance with public health policies. It takes advantage of the fact that the enforcement of public health policies rapidly implemented shortly after the surprising pervasiveness of COVID-19. The study exploits the regional variations in political orientation, using the 2017 presidential election and 2020 congressional election results from Seoul Metropolitan City in South Korea. The political orientations of each area are measured using the election results (votes cast for the winning candidate), and mobility is calculated from 11,004 bus stops in Seoul, which account for all the bus stations up to 2019. By combining these, variations within the city's smallest regional classifications in terms of political orientation and mobility could be examined, allowing us to implement a difference-in-differences approach to estimate the role of political orientation in complying with social distancing and mobility reductions using daily mobility data from 11,004 bus stations in Seoul spanning 2020 to 2021.

The key findings of this paper are as follows: The decline in weekend public transportation mobility during the three major waves of COVID-19 in 2020 and 2021 is significantly stronger in areas where fewer votes were cast for the president and the ruling party. The results are statistically significant for all waves and both the 2017 presidential election and 2020 legislative election results. Groups casting more votes for the president and his party before the crisis seemed to show stronger belief in the government's messages about successful quarantining and stimulus spending, which might have led to less compliance with social distancing and higher mobility levels. An investigation of heterogeneous behaviors divided by occupation and industry classification provides that areas with a high proportion of service workers, elementary workers, warehouses, and transportation businesses had less influence from political orientation in reducing mobility levels. A possible explanation could be that these workers had less access to remote work and had to work weekends. Robustness checks disclose that the effect remains consistent when using car traffic mobility data instead of public transportation mobility data.

Our study contributes to the literature on the impact of political alignment and trust in the government on public health policy compliance during the pandemic. While previous literature has commonly discussed the effect of political alignment on compliance with COVID-19 mitigation policies, the relationship between political messages and public health policies differs by nation. For instance, a study of political trust in European Union member states (Bargain and Aminjonov, 2020) shows that in situations where governments promote the severity of the COVID-19 pandemic and encourage citizens to avoid the virus, higher levels of political trust were aligned with higher compliance with health policies and showed a larger effect of policy stringency. Alternatively, in the case of the United States, where President Donald Trump and the Republican Party presented statements downplaying the severity of COVID-19, states more favorable to Republicans engaged in less social distancing and wore fewer face masks (Allcott et al., 2020). A study in Italy (Barbieri & Bonini, 2021) examines the role of trust towards the ruling political party and finds that provinces in favor of right-wing parties showed lower compliance rates with social distancing orders. To the best of our knowledge, this study is the first to utilize public transportation and road traffic data to measure compliance with social distancing. Apart from previous studies mainly using surveys from sampled populations and mobility from smartphone location data, this study's research design uses the election results measured from 425 electoral wards and mobility data calculated from 11,004 bus stops in Seoul. Additionally, this study observes all major COVID-19 outbreaks over the period 2020–2021, contrasting with most previous research solely focusing on a single widespread period.

The remainder of the paper is structured as follows: Section 2 reviews the background on the pandemic situation in Korea. Then, Sections 3 and 4 present the data and empirical methodology. Section 5 describes the main results of the study, after which section 6 describes the possible mechanisms. Finally, Section 7 concludes the paper with policy implications.

2. BACKGROUND

2.1. The Status of COVID-19 in Korea

A brief overview of the status of COVID-19 in South Korea from 2020 to 2021 is as follows[1]: The first known imported case of COVID-19 occurred on January 20, 2020, from a 35-year-old Korean woman who had traveled abroad. Subsequently, the first wave of the COVID-19 pandemic started on February 18, 2020, in the city of Daegu, about 150 miles southeast of Seoul. An explosive outbreak began among members of a religious group called Shincheonji, mostly affecting the country's southern regions (84% of the confirmed cases were from Daegu and Gyeongsangbuk-do). Alert levels were raised from orange to red on February 23, 2020, and the start of the 2020 public school academic year was delayed by more than a

[1] For a detailed description on South Korea's COVID-19 status, please visit http://ncov.mohw.go.kr/en/.

week by the Ministry of Education. Approximately 11,000 people were infected. The first super spreading wave ended around April 2020.

After several months of a well-controlled pandemic situation, South Korea faced a second wave of COVID-19 super spread beginning on August 3, 2020. The epicenter of the spread was Seoul, the capital city of South Korea. A massive outbreak started at a church named the Sarang-Jaeil Church and soon spread nationwide in two weeks. Such a rapid spread was due to negligence in social distancing and disobeying public health policies. The areas most affected by the pandemic were Seoul and Gyeonggi-do, the city's larger metropolitan area, where approximately 13,000 people were infected. The second wave ceased in September 2020.

Beginning November 13, 2020, Korea experienced the third wave of COVID-19 super spread. The spread was on a nationwide scale, infecting approximately 45,000 people until it diminished around January 20, 2021. Unlike the first and second waves, this widespread outbreak was not attributed to a particular group; however, it spread through an unspecified group of people, going undetected. Experts stated that the cause of the third wave of COVID-19 was due to a premature easing of the social distancing measures after the end of the second COVID-19 wave (Seong et al., 2021). Opposed to the advice from pandemic professionals, the government reduced the social distancing level to its lowest even though the pre-stated government standards for doing so were not met.

The fourth pandemic wave outburst began on July 8, 2021, after a public announcement from the Korean Disease Control and Prevention Agency. While the government issued a public statement that COVID-19 mitigation policies would be relaxed due to a well-controlled quarantine, the COVID-19 delta variant led to more than 180,000 infection cases occurring nationwide. Although the fourth wave ended in September 2021, the rate has not since fallen below 1,000 confirmed cases per day. For convenience, a graphical overview of the COVID-19 trends is provided in Appendix Graph 1.

2.2. The Government's Political Messages and Spending Revitalization Plans

As South Korea was going through the cyclical turbulence of multiple COVID-19 waves, the government's political stance focused on promoting an image of successful quarantines and a well-controlled pandemic response. The government often provided reassuring messages through official communication channels while announcing governmental policies to encourage the public to engage in economic activities. Government-issued messages ranged from celebrating quarantine success to public assurance on returning to school and enjoying safe holidays. Consumption-boosting policies with vouchers and stimulus checks were planned for distribution, and temporary national holidays were announced to foster summer vacations.[2] While public messages assuring the public and promoting consumption and leisure were ambient and persistent throughout the pandemic, Korea had to experience a total of four painful outbreaks of Coronavirus widespread. These periods represented the moments when political messages were confronted by the reality of the pandemic and subsequent quarantine measures. However, the vicious cycle comes into place, where public health policies implemented to reduce the widespread are again challenged by the ambient political messages promoted to the public. In Table 1, we summarize the political messages and spending revitalization plans announced by the government during periods when they were called into question by subsequent increases in virus infection cases.

[Table 1]

Before the occurrence of the Shincheonji mass infection incident, which led to the first wave of COVID-19 on February 18, 2020, the president issued a special message for the people on February 10, 2020, emphasizing that the novel coronavirus was not yet a serious disease to the nation, and people should feel at ease given that the fatality rate was not high (Korea.Net, 2020a). On March 30, 2020, the government praised its quarantine policies, saying that Korea was nearing victory against COVID-19 and would be recognized internationally as the golden standard of quarantining and pandemic mitigation (Korea.Net, 2020b). However, the Itaewon COVID-19 mass outbreak occurred soon after. On May 11, 2020, before the second wave of COVID-19, a stimulus payment program providing up to KRW 1,000,000 (USD 766.49 as of July 6, 2021) was provided per household to encourage consumer spending and drive the recovery in sales. Furthermore, a presidential message on the Korean New Deal Initiative (July 14, 2020) explained how "Korea is overcoming the COVID-19 crisis in an exemplary manner, managing to keep the daily infection levels low (Korea.Net, 2020c)." Unfortunately, a massive spread of the virus followed two weeks after.

Before the third wave of the pandemic, the government publicly announced that they were preparing for coexistence with the virus by reorganizing the social distancing system (Korea.Net, 2020d). This announcement was followed by the resumption of the $76.2 million domestic spending revitalization plan, which provided vouchers to citizens to encourage

[2] For a full timeline of the issued government messages, please visit https://www.korea.net/Government/Briefing-Room/Presidential-Speeches.

economic activity (October 18, 2020). As a result of the widespread of the virus following the message, the government issued an official apology for inadequate containment. However, political messages downplaying the COVID-19 situation did not end there. After revising the rules on public holidays to allow for longer summer vacations, at a meeting on pandemic prevention and control on June 7, 2021, the president assured safe summer holidays and a return to in-person classes in the second semester (Korea.Net, 2021a; Korea.Net, 2021b). Shortly after, a contrasting situation materialized as the fourth widespread of the pandemic struck the nation. As a result, new social distancing measures, including the prohibition of gatherings of more than two people, were, instead, heavily enforced.

Cases of political messages misrepresenting the COVID-19 situation have been frequently observed outside Korea. Some attempts were intentional, while others happened due to poor timing. Garrett (2020) comprehensively summarizes such cases in his study. For instance, in Japan, the government hesitated to fully disclose the mass infection on the Princess Diamond cruise ship, instead attempting to assure citizens of a well-controlled pandemic situation. In Iran, a devastating spread of disease soon followed the deputy health minister and the ruling council's persuasion that the pandemic was almost stabilized. This resulted in a devastating spread of disease in Iran. Through social media censorship and imprisonment, the Saudi Arabian government sought to silence communications on the danger of COVID-19 spreading in the nation. In the case of the United States, the Trump administration continuously suggested that the pandemic was a hoax, claiming the severity of the disease was exaggerated by the opposing Democratic Party.

3. DATA

When political messages challenge the pandemic situation, responses to pandemic mitigation policies are likely to vary by individuals. To quantify potential divergence in public responses, we appropriate several types of data—public transportation mobility data measured per bus station from 2017 to 2021 from the Seoul Open Data Service and the election results at the electoral ward level from the 2017 presidential and 2020 congressional elections from the Republic of Korea National Election Commission. The region of observation is restricted to Seoul Metropolitan City, where 20% of the total population of South Korea resides. The advantage of observing the effects in Seoul was the availability of rich traffic data and demographic information for all 425 wards (the smallest geographical unit of governmental statistical measurement). The unit of observation is the 425 electoral wards of Seoul, established based on being the appropriate size and having a suitable population for residential convenience and administrative efficiency.[3]

3.1. Public Transportation Mobility

We create an index calculating the mobility changes in a certain area using public transportation mobility data between January 2017 and December 2021. The data contain the daily number of boarding and deboarding passengers using the bus system, obtained from public transportation card information. The justification for using bus data to represent public transportation mobility is as follows: Buses account for 36.59% of total public transportation usage in 2020.[4] In Seoul, a total of 598 bus lines serve 11,004 bus stations (Seoul Metropolitan Government, 2022). Bus transport data are favored over subway data for our research due to Seoul's relatively small number of metro lines and stations (nine metro lines visiting 320 metro stations). Alternatively, Seoul's bus routes are classified into five types (trunk bus, branch bus, circulation bus, rapid bus, and local bus) to connect suburbs, the city center, and subcenters ubiquitously. By utilizing bus transportation data to measure the mobility of citizens, we take advantage of the abundant and even distribution of bus stations in the Seoul region. All 11,004 bus stations (every bus station in Seoul up to 2019) are matched to the 425 electoral wards using the coordinates from the Open Source Geographic Information System. The daily number of onboard passengers was collected per bus station, which was aggregated by ward to represent the daily mobility information for the 425 electoral wards. To control for time-series trends as well as seasonal and monthly characteristics, we apply a first difference to mobility levels in the pandemic years (February 2020–August 2021) by subtracting them from the pre-pandemic baseline period corresponding to February 2019–January 2020. Thus, the main outcome variable is the relative rate of mobility reduction for the 425 wards:

$$\Delta Mobility_t = \frac{Mobility_t - Mobility_{t-1}}{Mobility_{t-1}} \times 100. \qquad (1)$$

Finally, weekends are chosen as the time unit for the analysis to eliminate the effect of weekday commuting and capture mobility, mostly representing leisure and recreation.

[3] They are the smallest unit of measure dividing Seoul (Region (Si) > District (Gu) > Ward (Dong)).

[4] Cars, bus, and metro each consist of 24.5%, 24%, and 41.6% of the overall 32,162,000 daily traffic volume (Seoul Metropolitan City Report, 2022).

3.2. Political Orientation (Election Results)

As a proxy for political orientation, election results from before or during the early stages of the COVID-19 pandemic are used.[5] The 19th presidential election held in May 2017 is used to represent citizens' political alignment. Furthermore, the 21st congressional election results from April 2020 are also used to capture political orientation towards the ruling political party. Votes earned by the president (Moon Jae In) and the ruling party (the Democratic Party) are used as the main treatment intensity for the difference-in-differences setting. The distribution and mapping of political orientation from the election results are shown in Figure 1. In both elections, most wards supported the president and ruling party, even though there were variations by ward.

[Figure 1]

4. EMPIRICAL STRATEGY

We estimate the direct effect of political support on mobility to investigate the effect of political orientation on an individual's compliance with social distancing, using the timing of social distancing policies for a difference-in-differences (DID) approach confronting regions with high and low political approvals. Our main outcome variable is the reduction in human mobility during major periods of widespread COVID-19, compared to a baseline period before the pandemic. The treatment and reference periods are set as weekends one month before and after implementing mobility restriction measures. Three waves of COVID-19 outbreaks in Seoul Metropolitan City between 2020 and 2021 are used for the analysis. The first wave of COVID-19 is dropped, as it was mainly centered in Daegu and Gyunsangbuk-do, which are not closely related to Seoul. The empirical strategy relies on the variation in votes earned as political orientation among the electoral wards. The regression equation takes the following form:

$$Y_{ist} = \beta_0 + \beta_1 D_{is} + \beta_2 Post_t + \beta_3 (D_{is} \times Post_t) + \gamma Covid_{st-1} + X'_{ist}\delta + \theta_t + \eta_s + \varepsilon_{ist}. \quad (2)$$

[5] The 21st congressional election was held in April 15, 2020, shortly after the initial outbreak of COVID-19. However, the number of infections was very low in the initial stage of the pandemic, and less relevant with our region of observation, Seoul.

Y_{ist} is the mobility reduction rate (%) per ward i in district s, on day t. D_{is} is the percentage of votes the presidential candidate and the ruling party earned in ward i. A binary specification for D_{is} was also introduced to indicate whether the candidate received votes at more than the median level. This approach allows for comparing the wards that were more favorable to the president and his party and the less supportive wards. $Post_t$ is the post-reference period dummy separating the periods before the enforcement of social distancing policies and after the strengthened mobility restriction measures. Specifically, each timeframe is two months: one month for the pre-period and another for the post-period. Appendix Table 1 summarizes the reference and treatment periods for the three major waves of COVID-19 in Seoul.

$D_{is} \times Post_t$ is the interaction term, providing the main coefficient of interest. If political orientation has a negative effect on mobility reduction, the coefficient for the interaction term, β_3, is expected to show a positive sign. $Covid_{st-1}$ is the number of COVID-19 infections in the district on day $t-1$. By including the number of COVID-19 confirmed cases in the previous day as a control, we intend to control for both the direct and indirect effects of the local pandemic outbreak. First, one may perceive large infection numbers as a higher chance of encountering those who are infected and reduce mobility. Additionally, this information reflects the amount of exposure to emergency messages and the exigency to comply with government policies. The emergency alert text messages received when an infection case has been recorded in a nearby location may act as a warning sign to disseminate information and encourage preventive behaviors (Lee & You, 2021). The vector X_{ist} is a set of covariates that could potentially affect the outcome variable even without public policy intervention. It controls for regional characteristics, including population density, the proportion of the elderly population to the total population, resident job proportion, official land price, and the proportion of workers per occupation and industry. Fixed effects are also added for days and districts. There are 25 districts in Seoul at the time of this study. Standard errors are clustered by electoral ward. Summary statistics on the major variables are provided in Table 2.

[Table 2]

5. RESULTS

5.1. Visual Evidence: Common time trends

Since this study is based on DID estimators, the parallel trend assumption that differences in mobility are constant over time for the wards in the reference periods should be held. Visual evidence is provided in Figure 2 to observe parallel trends and the effect of regional variations in political orientation.[6]

[Figure 2]

Figure 2 exhibits time trends, comparing the wards that casted large numbers of votes for the president or the ruling democratic party (straight blue line) and those that casted fewer votes (dashed red line). The green vertical line separates the periods before and after the social distancing policies were implemented. The results depicted in the graph indicate that the common time trend is a reasonable assumption. Before implementing the enhanced social distancing policies, two groups show very similar trends and only miniscule differences in mobility levels. We then observe a sharp reduction in relative mobility after the enforcement of social distancing policies. This drop is significantly more pronounced for regions less favorable to the government, with the difference persisting until the end of our observation period. In conclusion, there is less evidence of blatant violations of the common time trend in the data, and the social distancing policy appears to have a diverging impact on mobility reduction for groups with varying levels of trust in the government.

5.2. Effects on Public Transportation Mobility

Table 3 shows the estimation results on mobility reduction behaviors. In this regard, Panels A and B represent the two types of election results used for the regression. The columns reflect our observation periods for three major waves of pandemic outbreaks. The independent variable of interest is the interaction term between votes cast (political orientation) and the post-reference period dummy, specified in the first rows of each panel. The estimates capture the effect of political orientation towards the government and the ruling party on the relative mobility reduction level, controlling for the difference in mobility trends by region and day through the district and day fixed effects. The results indicate that the mobility of citizens living

[6] In Figure 2, we show only Sunday since Saturday and Sunday have different mobility patterns. Presenting only Saturday has a similar reduction in mobility. The graphs are available on request.

in areas with a large volume of votes cast in favor of the president and his party decreases less than in other regions ($\beta_3 > 0$)[7]. In other words, wards that are less supportive of the government reduced their mobility more than their counterparts. Back-of-the-envelope calculations indicate that regions decrease mobility 1.75–3.15 percentage points more when votes cast in favor of the president decrease by 10%. In the case of the congressional election, the same 10% loss in votes resulted in a 1.12–1.81% decline in relative mobility levels.

[Table 3]

Table 4 shows the estimation results using a binary measure of political orientation comparing the areas, each casting high and low proportions of votes on the president and the ruling party.[8] The effects remain significant and consistent with the specification using the continuous number of votes earned. Citizens living in wards favorable to the government move around more than their counterparts. Regions casting more votes in favor of the president exhibit 0.77–1.56 percentage points more transportation usage than less supportive regions, suggesting that political orientation significantly affects compliance with social distancing policies. The results are statistically significant at the 1% level and are consistent for all three periods of widespread outbreaks, for election results and both continuous and binary specifications.

[Table 4]

5.3. Effects on Overall Car Traffic Mobility

A possible concern could be that the reduction in public transportation usage may not fully reflect the mobility patterns of residents. This could be the case if people substituted public transit with transportation by car. To debunk such a concern, we also test for mobility changes using overall car traffic as the dependent variable. Data from the Seoul Open Data Portal provide the daily number of vehicles passing through a certain point on major roads. A total of 139 traffic beacons[9] installed on major roads by the Seoul Transport Operation and

[7] The coefficient is interpreted as follows: As our dependent variable is the relative rate of mobility reduction (as defined in Equation 1), its negative value indicates that people reduced movement due to COVID-19 compared to a year ago. Therefore, estimated coefficients represent the magnitude of people's diminishing mobility levels.

[8] The binary specification separates the 425 wards into two regions—a high approval and a low approval region—using the median of votes earned by candidates.

[9] Although there are 139 beacons installed, road traffic is measured for both directions, allowing us to calculate the overall car traffic mobility for approximately 250 wards.

Information System (TOPIS) are matched with the electoral wards to measure the daily regional traffic congestion. The beacons count the daily number of automobiles on the road and thus enable researchers to capture mobility by vehicles other than buses. However, a limitation existed in the relatively small number of beacons. As a result, only the mobility of approximately 250 wards (59%) was included in the sample. The estimation results using car traffic mobility are provided in Table 5.

[Table 5]

The results provide a consistent story with public transportation mobility. The positive and significant coefficients for road traffic mobility reduction suggest that the decrease in bus mobility is not the result of an increase in car traffic mobility.[10] The evidence strengthens the effect of political orientation, where people in favor of the government and the ruling party show less mobility reduction in both public transportation and car usage.

5.4. Eliminating Outlying Districts

Another concern is whether the effect of political orientation comes from outlying areas. Three districts in Seoul, Gangnam-gu, Seocho-gu, and Songpa-gu, have historically tended to provide election results strongly in favor of the conservative party in most elections. Hence, these three conservative districts are commonly known as the *Gangnam 3-gu* in Korea. For instance, the proportion of votes earned by the former liberal president in the 2017 presidential election were 34.3%, 34.9%, and 39.1%, respectively, far lower than the city's pooled mean of 41.2%. In the case of the 2020 congressional election, the percentage of votes earned by the liberal party were 38.7%, 39.5%, and 47.9% each, lower than the city's pooled mean of 52.7% (Republic of Korea National Election Commission, 2021). Thus, to test whether these outlier districts distorted the true effect of political orientation, we run the regression without these three districts. The results are summarized in Table 6 and are consistent before and after eliminating the outlier districts, suggesting that the estimated effects are not the outcome of distortion from outliers.

[Table 6]

[10] Although the coefficients are not significant for the second wave, the sign and magnitude are similar to the results in Table 3.

5.5. False Specification Testing

Although we have graphically interpreted the common time trend assumption before the treatment period in Figure 2, a placebo regression is implemented to validate further that the mobility reduction difference after public health policy enforcement was indeed from the political orientation effect. We assume that the COVID-19 public health policies and mobility restraints were implemented between the years 2018–2019 instead of 2020–2021. The weekends and months are identical to the main specification. Table 7 shows the results. Compared to the main specification results, all coefficients in the placebo test lose significance with coefficients near zero. Thus, we do not reject the null hypothesis of parallel trends.

[Table 7]

6. MECHANISMS

6.1. Government Messages and Policies Contrasting with the Pandemic Situation

From the empirical findings, we suggest an important mechanism to explain the disparities in mobility responses: the conflicting stance between political messages and public health policies on responding to COVID-19 situations. Conceiving different information, individuals believing the messages could have prioritized political assurance over scientific truth. To elaborate, when social distancing policies and quarantine measures were enforced in response to the pandemic, persistent government messages on the successful mitigation of COVID-19 and encouragement to resume essential economic activities may have hindered individuals from complying with scientific policy measures.

When individuals embrace the government message based on their political orientation, they adjust their social behavior and policy compliance to institutional trust levels (Bargain & Aminjonov, 2020; Bartscher et al., 2021). Revisiting Table 1, the phenomenon is clearly visible. The president and his administration's ambient message promoting stable safety nets and quarantine success at times were in direct conflict with skyrocketing infection rates. Before the major COVID-19 outbreaks, the government assured the public that the pandemic would soon be over. Relatedly, in May and October 2020, the government announced domestic spending revitalization plans to promote consumption and economic activities, which were soon postponed due to subsequent increases in COVID-19 infections (Jung et al., 2021).

These messages opposing the severe and widespread of the virus may have downplayed the actual severity of the crisis. Individuals with more support for the government decided to comply with social distancing based on these messages of successful quarantine handling. When the government encouraged consumption and outdoor activities by providing consumption vouchers and longer alternative holidays, those supportive of the government were convinced by the political stance of a well-controlled pandemic situation. Thus, they did not reduce their movements and engaged more in social activities after feeling safe from the government's signals. Several studies provide consistent evidence for this possible mechanism (Bartscher et al., 2021; Bavel et al., 2020; Bonell et al., 2020; Corbu et al., 2021; Dirks & Ferrin, 2001), suggesting a strong relationship between trust in an institution and adherence behaviors.

This study's empirical findings are in line with recent literature on the role of trust and belief in compliance with social distancing and quarantine.[11] Allcott et al. (2020) observe the effect of partisan differences for the Trump administration in the United States, where states with higher support for Trump's public messages on safety, the ineffectiveness of face masks and quarantine tend to have citizens who move more and ignore quarantine measures. Republicans, following President Trump's messages about the low threat of COVID-19, showed less concern over the virus spread, did not avoid public places, and engaged in more social activities (Marist, 2020; Piacenza, 2020; Saad, 2020). In contrast, Bargain and Aminjonov (2020) reveal how higher trust in the government led to better compliance with social distancing for 17 European nations where the government consistently provided messages supporting the social distancing measures. Another study in Romania suggests that individual compliance with restrictive measures is shaped by trust in institutions or belief in conspiracy theories surrounding the COVID-19 outbreak (Corbu et al., 2021). We suggest that South Korea's situation aligns with that of the United States, where the conflict between the government's political messages and social distancing policies induced different responses to policy compliance.

[11] This study also goes forward with previous research in its empirical strategies, using the enforcement dates of social distancing policies during the pandemic widespread for our DID specification. This was due to the inability to use government messages to separate the pre and post-intervention periods. The president and the ruling party's public messages were frequently and persistently provided during the pandemic, announced before, during, and after our observation periods. This makes it difficult to pinpoint the start of each intervention period, as well as ensure the validity of our parallel trend assumption.

6.2. Effects of Industry and Occupation Classification

Another possible channel of the effect is occupation and industry characteristics. In response to the pandemic, companies actively adjusted working conditions and the environment according to each industrial and occupational characteristic (Kim, 2020). Multiple companies moved to remote work and delivery services, and the logistics industry expanded its business in response to the soaring demands (Statistics Korea, 2020). However, regional differences in industry and job characteristics may have evoked a differential response to the containment measures regardless of political orientation. As certain industries could not flexibly adjust their face-to-face work in response to surging demand (Park et al., 2021), workers may have had no choice but to commute to work even on weekends. Concerns about job loss and loss of income may also have influenced the decision to continue to work despite one's political orientation and the risk of infection. Existing literature supports such possibilities by suggesting concerns about unemployment and wage loss as important components of compliance with health policies (Bodas & Peleg, 2020; Lau et al., 2007). If workers prioritized financial stability during the pandemic situation, there could be a possibility that they chose to continue working regardless of one's political orientation and the risk of infection. To investigate such heterogeneous effects, we extract the industrial and occupational characteristics of the 425 wards from the Seoul Open Data Service.

First, we observe the effect of two industries: logistics and transport business. An indicator variable on whether there is a logistics and warehouse facility in the region is used to separate the wards by the presence or absence of an active logistics industry. Additionally, we observe the effect of the transport industry by using a binary specification to indicate whether the share of transport business in the region is above the average level of 14.88%. Table 8 shows the results divided by industry classification. Unlike the pooled results, areas with warehouses and logistics industry workplaces were less influenced by the political alignment of the residents in their mobility levels. Also, areas with large transport businesses showed no differences in mobility reduction according to their voting results.

If these wards behaved accordingly to their government approval ratings, their mobility levels should have been higher than their counterparts. However, in contrast to our pooled estimation results, higher support for the government had less influence in areas with logistics and transport businesses. Smaller and insignificant coefficients imply that channels other than political orientation induced such heterogeneity. We suggest the availability of remote work as the primary cause. The report on the transportation survey announced by

Statistics Korea provides that warehouses and logistics workers increased by 46,000 people, followed by sales increasing by approximately one trillion KRW (USD 764,890,000 as of July 6) in 2020. These industries require face-to-face operations, from product packaging to delivery. Thus, the aggregate mobility reduction could have been offset by increased commuting workers in the logistics and transport industries.

[Table 8]

Next, we investigate the effect of two occupations: service and elementary jobs. A binary variable, whether the proportion of service and elementary workers is larger than the mean level (36.02% and 8.62% each), separates the wards into high and low-proportion regions. Table 9 shows that compliance with mobility restrictions is less pronounced for areas with a high proportion of service and elementary workers. Even if these wards showed higher support for the president and the ruling party, the workers' political orientation was less considered in deciding whether to decrease mobility. On the other hand, the channel of political approval remains strong and prominent for areas with less service and elementary occupations.

Consistent with the previous literature suggesting income level as a factor influencing compliance to social distancing policy (Chiou & Tucker, 2020; Coven & Gupta, 2020), workers in low-paying occupations have shown less variation in their mobility mainly from their concern for job stability and income loss. Unlike other jobs, workers in the service or elementary job sectors usually work even on the weekends (Job Korea, 2018). Workers in these occupations get paid less on average, earning about 1.6 to 1.8 million KRW (USD 1378 as of July 6) less per month than workers overall (Employment and Labor Statistics Korea, 2020). Even if one perceived the pandemic situation as dangerous due to disbelief in the political messages, the worker still had to commute to one's workplace. By simple calculation, the workers may be risking higher chance of infection and forgoing on political orientation to earn approximately KRW 64,000-73,000 (USD 49-56) a day by commuting to work on weekends.[12]

[Table 9]

[12] Counter to expectation, Appendix Table 5 shows that the area's student population or the availability of local private education institutions did not influence mobility reduction through the channels of political orientation.

7. CONCLUSION

This paper examines the role of institutional trust by analyzing the effect of political orientation on compliance with social distancing policies. We observe 425 electoral wards in Seoul Metropolitan City to examine if citizens' abidance by public health policies mainly comes from their political stance before the COVID-19 pandemic. Estimation results suggest that political alignment significantly influences the decision to reduce mobility when the government enforced social distancing policies. The decline in weekend mobility is significantly stronger in areas where the citizens' voting results showed less support for the president and the ruling party. The effect is consistent throughout all periods of major nationwide COVID-19 spread and consistent for political orientation in both the presidential and congressional elections. The main channel of the effect comes from the role of the government's public message on successful pandemic intervention. Other channels include occupation and industry types, accessibility to remote work, and concern on income loss.

While quarantine measures are most effective when all people make a uniform effort based on mutual understanding on the importance of health policies, political orientation results in different responses towards social distancing and abiding by public health policies when combined with political messages of quarantine success. Thus, room for improvement is clear. The government's public messages should not downplay the severity of the pandemic but instead align with public health policies for mitigation measures to gain maximum strength.

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Table 1: Timeline on Government Messages, Spending Revitalization Plans, and subsequent COVID-19 outbursts

Government Messages on COVID-19 Spending Revitalization Plans	Subsequent COVID-19 Outbreak
・“Novel Coronavirus is not a serious disease in our country.” ・“People should be able to feel at ease, given that the fatality rate is low.” (Senior Secretaries Meeting, Feb 10, 2020)	・First wave of COVID-19 outbreak (Feb 18, 2020) ・Alert levels were raised to red (Feb 23, 2020)
・“Korea is near victory against COVID-19. Korea’s pandemic mitigation will be recognized as the golden standard internationally” (Emergency Economic Council Meeting, 30 Mar, 2020)	・Itaewon COVID-19 mass outbreak (May 5, 2020)
・Emergency relief funds ($1,000) to all Koreans (May 11, 2020) ・“Korea is overcoming the COVID-19 crisis in an exemplary manner. We successfully managed to keep our daily infections low, without stopping the economy.” (Korean New Deal Initiative, Jul 14, 2020)	・Second wave of COVID-19 outbreak (Aug 3, 2020)
・Resume on the domestic spending revitalization plan ($76.2 million), providing consumption vouchers (Oct 18, 2020) ・“Government should prepare for coexistence with the virus by reorganizing the social distancing system. Also, efforts to boost economic vitality should be redoubled.” (Senior Secretaries Meeting, Nov 2, 2020)	・Third wave of COVID-19 outbreak (Nov 13, 2020)
・“In-person classes will be able to resume smoothly in the second semester.” ・“The government will do our utmost to ensure that people are fully able to take a vacation.” (Meeting to Check Epidemic Prevention and Control, Jun 7, 2021) ・Extended summer holiday period by revising [Rules on Public Holidays] for longer alternative holidays (July 7, 2021)	・Fourth wave of COVID-19 outbreak (July 8, 2021)

Note: Sources for the presidential speeches is Korea.net, the official governmental site providing an English translation of all major public messages provided by the 19th president of the Republic of Korea

Table 2: Summary Statistics

Variables	Second Wave (Aug.2020 – Sept. 2020)			Third Wave (Nov. 2020 – Jan. 2021)			Fourth Wave (Jul.2021 – Aug. 2021)		
	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
Panel A: Traffic Mobility									
Mobility reduction (%) (Public Transportation)	6784	-30.53	16.70	6784	-36.91	15.87	6784	-30.53	9.14
Mobility reduction (%) (Car Traffic)	1996	-9.94	16.36	1935	-14.25	13.97	1985	-12.88	11.76
Passengers per bus station (24h)	6784	5475	4255	6784	5433	4451	6784	5808	4362
Car traffic per beacon (24h)	2110	28203	16407	2020	28797	17245	2087	28917	17283
Panel B: Election Results									
Votes Earned by President (%)	6784	41.15	3.95	6784	41.15	3.95	6784	41.15	3.95
Votes Earned by Ruling party (%)	6768	52.66	7.48	6768	52.66	7.48	6768	52.66	7.48
Panel C: Ward and District Characteristics									
COVID-19 incident (t-1)	6784	2.07	3.07	6784	7.19	8.49	6784	15.36	10.55
Population density	6784	23869	11768	6784	23733	11665	6784	23446	11515
Elder ratio (%)	6784	16.02	3.40	6784	16.27	3.45	6784	16.48	3.39
Land price ($10{,}000\ won/1m^2$)	6784	437.74	538.37	6784	439.26	515.53	6784	449.87	331.75
Number of students	6784	35678	15092	6784	35678	15092	6784	35678	15092
Number of private institutes	6784	614.71	499.14	6784	614.71	499.14	6784	614.71	499.14
Worker population (%)	6784	74.67	221.82	6784	74.67	221.82	6784	74.67	221.82
Service worker (%)	6784	36.02	13.28	6784	36.02	13.28	6784	36.02	13.28
Production worker (%)	6784	5.62	6.38	6784	5.62	6.38	6784	5.62	6.38
Sales worker (%)	6784	16.46	7.90	6784	16.46	7.90	6784	16.46	7.90
Elementary worker (%)	6784	8.43	1.80	6784	8.43	1.80	6784	8.43	1.80
Logistics and warehouse	6784	4.48	20.69	6784	4.48	20.69	6784	4.48	20.69
Transport business	6784	7.48	8.19	6784	7.48	8.19	6784	7.48	8.19

Table 3: Effect of Political Orientation on Mobility Reduction

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
Votes received × Post	0.306***	0.315***	0.175***
	(0.062)	(0.051)	(0.034)
Votes received (%)	0.043	0.047	0.067
	(0.112)	(0.089)	(0.137)
Post	-35.78***	-39.63***	-22.11***
	(2.648)	(2.126)	(1.486)
Mean of dep. variable	-30.53	-36.91	-30.53
Observations	6,784	6,784	6,784
R-squared	0.832	0.888	0.486
	Panel B: Congressional Election Results (April 2020)		
Votes received × Post	0.132***	0.181***	0.112***
	(0.031)	(0.025)	(0.017)
Votes received (%)	0.084	0.025	-0.039
	(0.053)	(0.042)	(0.067)
Post	-30.11***	-36.14***	-20.85***
	(1.754)	(1.338)	(0.994)
Mean of dep. variable	-30.50	-36.87	-30.48
Observations	6,768	6,748	6,768
R-squared	0.835	0.890	0.487

Note: Each row represents the waves of COVID-19 outbreaks during 2020–2021. The dependent variable of interest is the mobility reduction rate for each corresponding period. Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** $p<0.01$, ** $p<0.05$, and * $p<0.1$

Table 4: Effect of Political Orientation on Mobility Reduction (Binary Approval Ratings)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
High Approval Rating × Post	1.562***	1.244***	0.774***
	(0.429)	(0.401)	(0.258)
High Approval Rating [0-1]	-0.304	-0.180	0.105
	(0.564)	(0.555)	(0.707)
Post	-23.95***	-27.33***	-15.32***
	(0.446)	(0.342)	(0.340)
Mean of dep. variable	-30.53	-36.91	-30.53
Observations	6,784	6,784	6,784
R-squared	0.831	0.886	0.484
	Panel B: Congressional Election Results (April 2020)		
High Approval Rating × Post	1.310***	1.149***	0.906***
	(0.433)	(0.400)	(0.257)
High Approval Rating [0-1]	0.675	0.994**	0.273
	(0.497)	(0.504)	(0.635)
Post	-23.80***	-27.25***	-15.36***
	(0.451)	(0.344)	(0.341)
Mean of dep. variable	-30.50	-36.87	-30.48
Observations	6,768	6,768	6,768
R-squared	0.834	0.889	0.486

Note: Table 4 shows the estimation results using a binary specification for the main regressor "votes received." Regions are separated into high-approval and low-approval groups using the median level of votes received by the president and the ruling party. Each row represents the waves of COVID-19 outbreaks during 2020–2021. The standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest.
*** p<0.01, ** p<0.05, and * p<0.1

Table 5: Effect of Political Orientation on Mobility Reduction (Car Traffic Mobility)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
Votes received × Post	0.246	0.273***	0.214**
	(0.204)	(0.087)	(0.086)
Votes received (%)	0.063	-0.235	0.044
	(0.256)	(0.159)	(0.170)
Post	-17.01**	-34.99***	-18.03***
	(8.487)	(3.444)	(3.502)
Mean of dep. variable	-9.939	-14.25	-12.88
Observations	1,996	1,935	1,985
R-squared	0.568	0.708	0.358
	Panel B: Congressional Election Results (April 2020)		
Votes received × Post	0.134	0.131***	0.094**
	(0.114)	(0.044)	(0.040)
Votes received (%)	0.066	-0.126	0.064
	(0.168)	(0.079)	(0.100)
Post	-13.87**	-30.59***	-14.21***
	(6.099)	(2.272)	(2.224)
Mean of dep. variable	-9.939	-14.25	-12.88
Observations	1,996	1,935	1,985
R-squared	0.568	0.707	0.358

Note: Table 5 is the estimation results for mobility captured from overall road traffic instead of bus transportation usage. Each row represents the waves of COVID-19 outbreaks during 2020–2021. The dependent variable of interest is the mobility reduction rate for each corresponding period. Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Table 6: Effect of Political Orientation on Mobility Reduction (Eliminating Outlier Districts)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
Votes received × Post	0.359***	0.207***	0.161**
	(0.090)	(0.082)	(0.068)
Votes received (%)	-0.011	0.083	0.134
	(0.162)	(0.129)	(0.156)
Post	-37.86***	-35.09***	-21.59***
	(3.848)	(3.465)	(2.946)
Mean of dep. variable	-30.23	-36.67	-30.31
Observations	5,712	5,712	5,712
R-squared	0.838	0.885	0.497
	Panel B: Congressional Election Results (April 2020)		
Votes received × Post	0.127**	0.111***	0.128***
	(0.054)	(0.042)	(0.034)
Votes received (%)	0.057	0.054	-0.069
	(0.080)	(0.066)	(0.080)
Post	-29.66***	-32.38***	-21.79***
	(3.012)	(2.328)	(1.981)
Mean of dep. variable	-30.18	-36.62	-30.26
Observations	5,696	5,696	5,696
R-squared	0.840	0.888	0.497

Note: Each row represents the waves of COVID-19 outburst during 2020–2021. The dependent variable of interest is the mobility reduction rate for each corresponding period. Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Table 7: False Specification Test

Variables	(1) Counterfactual 2nd Wave (Aug.2018 – Sept. 2018)	(2) Counterfactual 3rd Wave (Nov. 2018 – Jan. 2019)	(3) Counterfactual 4th Wave (Jul.2019 – Aug. 2019)
	Panel A: Presidential Election Results (May 2017)		
Votes received × Post	-0.061	0.151	0.080
	(0.057)	(0.097)	(0.052)
Votes received (%)	-0.357	-0.282	-0.496
	(0.276)	(0.242)	(0.346)
Post	3.209	-3.206	-3.285
	(2.325)	(4.195)	(2.253)
Mean of dep. variable	0.268	-0.040	1.665
Observations	5,922	6,768	5,922
R-squared	0.224	0.228	0.283
	Panel B: Congressional Election Results (April 2020)		
Votes received × Post	0.025	0.046	0.025
	(0.024)	(0.057)	(0.028)
Votes received (%)	-0.025	0.103	-0.028
	(0.150)	(0.140)	(0.186)
Post	-0.632	0.513	-1.341
	(1.255)	(2.840)	(1.558)
Mean of dep. variable	0.324	-0.006	1.750
Observations	5,908	6,752	5,908
R-squared	0.220	0.228	0.279

Note: Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Table 8: Effect of Political Orientation on Mobility Reduction by Industrial Classification

	Logistics and Warehouse				Transport Business			
	Presidential Election (May 2017)		Legislative Election (April 2020)		Presidential Election (May 2017)		Legislative Election (April 2020)	
Variables	(1) Low freq. wards	(2) High freq. wards	(3) Low freq. wards	(4) High freq. wards	(5) Low freq. wards	(6) High freq. wards	(7) Low freq. wards	(8) High freq. wards
Panel A: Second COVID-19 Widespread (Aug 2020 ~ Sept 2020)								
Votes Earned × Post	0.302***	0.311*	0.129***	0.268*	0.336***	0.132	0.159***	0.047
	(0.064)	(0.179)	(0.032)	(0.146)	(0.067)	(0.164)	(0.035)	(0.080)
Mean of dep. variable	-30.58	-29.41	-30.55	-29.41	-31.35	-29.32	-31.30	-29.32
Approval Rating (%)	41.07	42.83	52.59	54.02	40.69	41.82	50.90	55.25
Observations	6,480	304	6,464	304	4,048	2,736	4.032	2.736
R-squared	0.831	0.922	0.833	0.922	0.824	0.866	0.827	0.867
Panel B: Third COVID-19 Widespread (Dec 2020 ~ Jan 2021)								
Votes Earned × Post	0.315***	0.233	0.181***	0.031	0.341***	0.014	0.186***	0.052
	(0.052)	(0.259)	(0.025)	(0.166)	(0.056)	(0.124)	(0.030)	(0.059)
Mean of dep. variable	-36.94	-36.18	-36.90	-36.18	-37.95	-35.38	-37.88	-35.38
Approval Rating (%)	41.07	42.83	52.59	54.02	40.69	41.82	50.90	55.25
Observations	6,480	304	6,464	304	4,048	2,736	4,032	2,736
R-squared	0.888	0.939	0.891	0.939	0.885	0.904	0.887	0.905
Panel C: Fourth COVID-19 Widespread (July 2021 ~ Aug 2021)								
Votes Earned × Post	0.182***	0.099	0.114***	0.036	0.201***	-0.020	0.129***	0.026
	(0.035)	(0.133)	(0.017)	(0.119)	(0.036)	(0.103)	(0.019)	(0.043)
Mean of dep. variable	-30.55	-30.10	-30.50	-30.10	-31.67	-28.83	-31.61	-28.83
Approval Rating (%)	41.07	42.83	52.59	54.02	40.69	41.82	50.90	55.25
Observations	6,480	304	6,464	304	4,048	2,736	4,032	2,736
R-squared	0.487	0.812	0.487	0.811	0.560	0.560	0.560	0.516

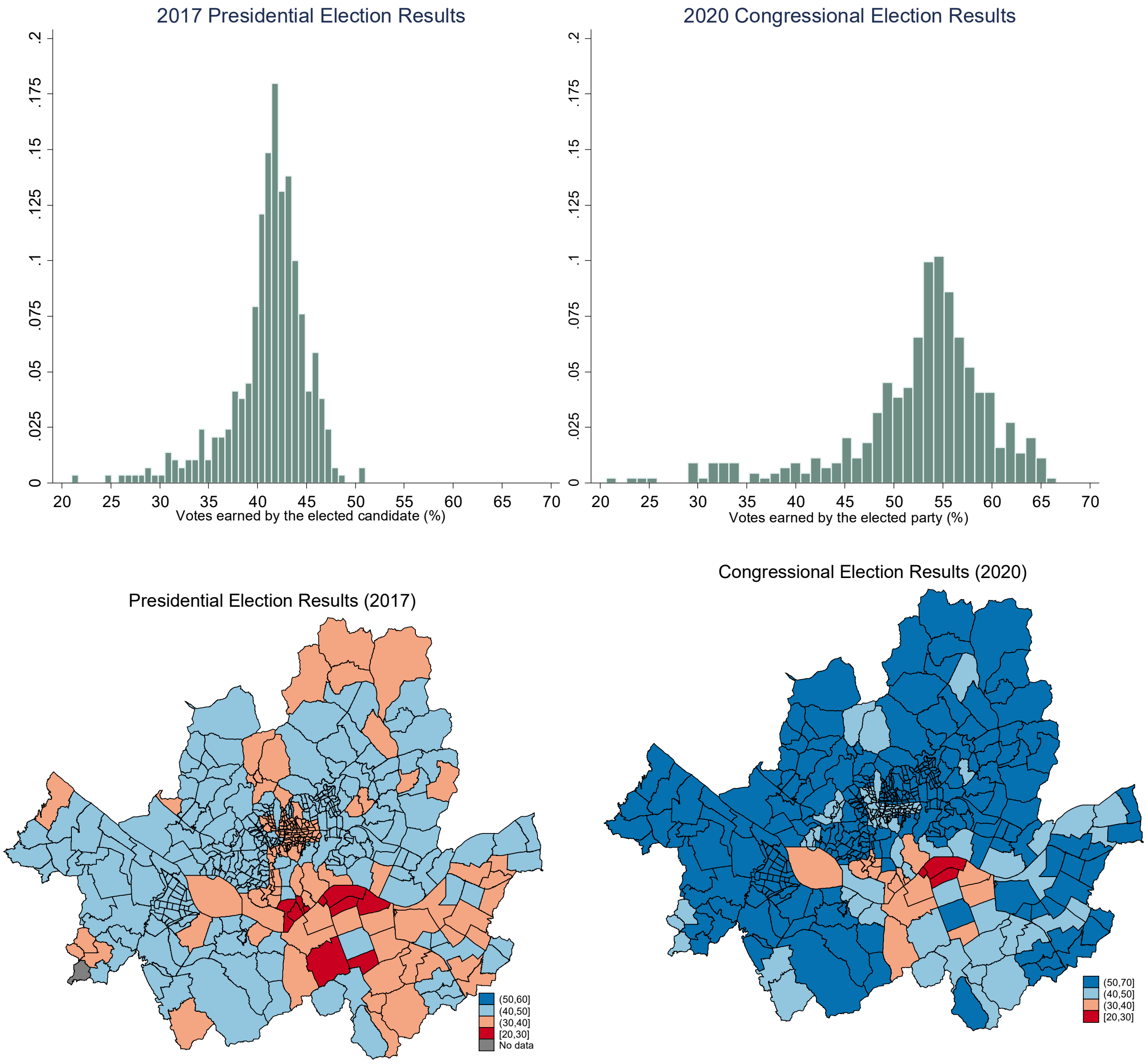
Note: Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Table 9: Effect of Political Orientation on Mobility Reduction by Occupation

	Proportion of Service Occupations Workers				Proportion of Elementary Occupations Workers			
	Presidential Election (May 2017)		Legislative Election (April 2020)		Presidential Election (May 2017)		Legislative Election (April 2020)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Low	High	Low	High	Low	High	Low	High
	Panel A: Second COVID-19 Widespread (Aug 2020 ~ Sept 2020)							
Votes Earned × Post	0.281***	0.203*	0.125***	0.023	0.283***	0.039	0.134***	-0.115
	(0.079)	(0.105)	(0.040)	(0.071)	(0.070)	(0.120)	(0.035)	(0.073)
Mean of dep. variable	-31.23	-29.84	-31.16	-29.84	-31.32	-29.33	-31.26	-29.33
Approval Rating (%)	40.08	42.20	49.87	55.40	40.33	42.40	50.99	55.21
Observations	3,376	3,408	3,360	3,408	4,112	2,672	4,096	2,672
R-squared	0.808	0.872	0.811	0.871	0.811	0.882	0.814	0.882
	Panel B: Third COVID-19 Widespread (Dec 2020 ~ Jan 2021)							
Votes Earned × Post	0.298**	0.076	0.144***	0.079	0.287***	-0.023	0.167***	-0.022
	(0.066)	(0.095)	(0.035)	(0.054)	(0.058)	(0.082)	(0.029)	(0.050)
Mean of dep. variable	-38.20	-35.63	-38.12	-35.63	-38.29	-34.78	-38.23	-34.78
Approval Rating (%)	40.08	42.20	49.87	55.40	40.33	42.40	50.99	55.21
Observations	3,376	3,408	3,360	3,408	4,112	2,672	4,096	2,672
R-squared	0.877	0.909	0.880	0.908	0.878	0.913	0.881	0.913
	Panel C: Fourth COVID-19 Widespread (July 2021 ~ Aug 2021)							
Votes Earned × Post	0.141***	0.159*	0.088***	0.118**	0.184***	-0.084	0.115***	-0.018
	(0.0392)	(0.095)	(0.022)	(0.0469)	(0.039)	(0.072)	(0.020)	(0.032)
Mean of dep. variable	-31.59	-29.48	-31.51	-29.48	-31.52	-28.99	-31.46	-28.99
Approval Rating (%)	40.08	42.20	49.87	55.40	40.33	42.40	50.99	55.21
Observations	3,376	3,408	3,360	3,408	4,112	2,672	4,096	2,672
R-squared	0.476	0.521	0.482	0.511	0.472	0.520	0.475	0.516

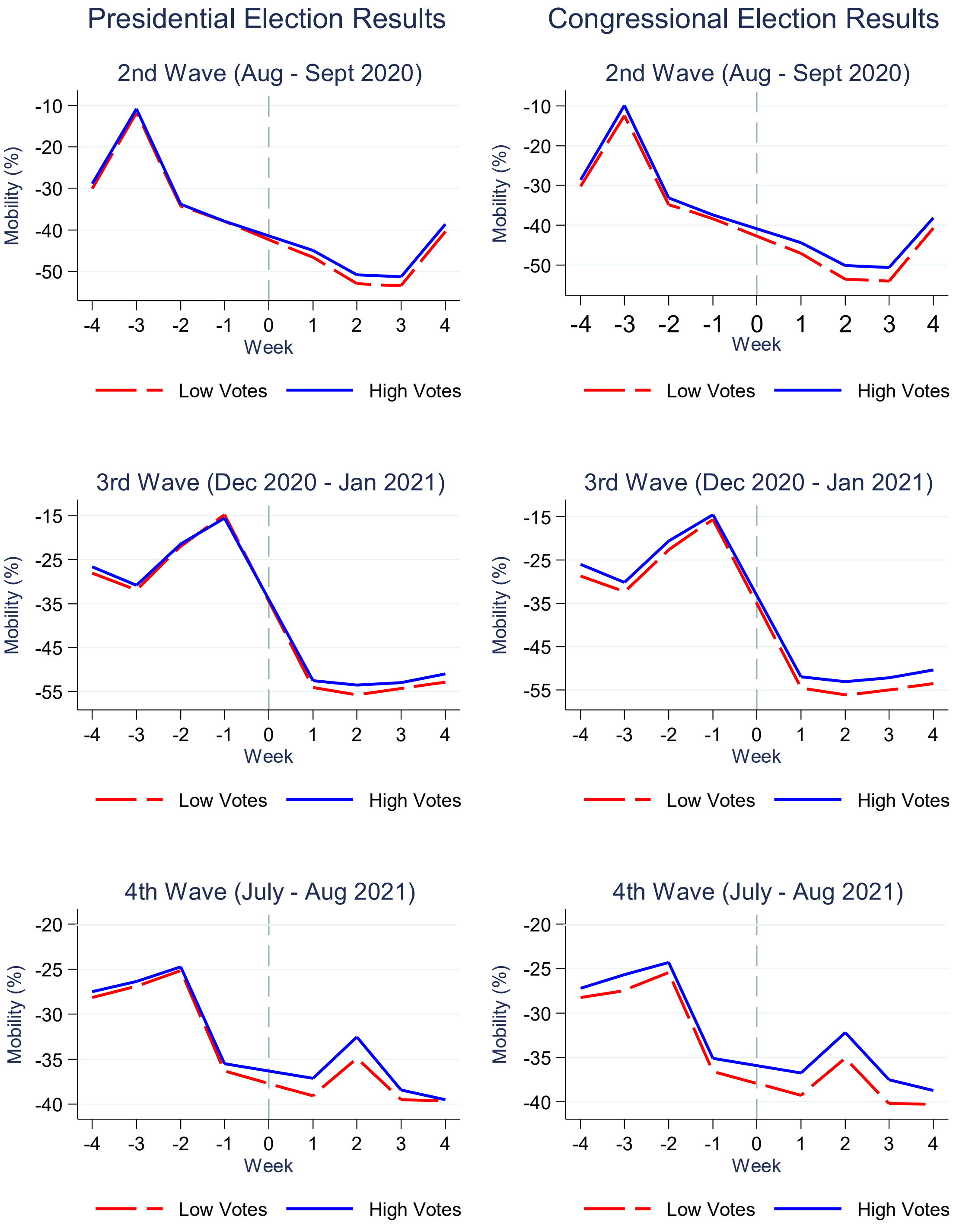
Note: Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Figure 1: Election Results (in Seoul, by Wards)



Note: The election results are based on the 19th presidential election statistics and the 21st National Assembly Elected Candidate statistics data from the Republic of Korea National Election Commission, according to the 425 wards in Seoul are used. The "spmap" package in *STATA* is applied to visualize the election results according to the 425 wards in Seoul, South Korea.

Figure 2: Mobility Reduction Trend by Votes Earned (Sundays)



Note: Figure 2 presents mobility reduction rates for wards that have cast large votes on the president or the ruling congress party (red dashed line) and wards with fewer votes (blue straight line). The green vertical line separates the treatment and reference periods. Both specifications using the presidential and congressional election results are presented. Among the four major waves of COVID-19, results for the second to fourth waves are provided. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest.

Appendix Table 1: Treatment and Reference Periods for Waves of COVID-19

Reference Period (PRE)									Treatment Period (POST)								
First Wave (Social Distancing Enforcement: Mar 22, 2020)																	
Year	Days of Observation								Year	Days of Observation							
2019	2/23	2/24	3/2	3/3	3/9	3/10	3/16	3/17	2019	3/30	3/31	4/6	4/7	4/13	4/14	4/20	4/21
2020	2/22	2/23	2/29	3/1	3/7	3/8	3/14	3/14	2020	3/28	3/29	4/4	4/5	4/11	4/12	4/18	4/19
Second Wave (Social Distancing Enforcement: Aug 16, 2020)																	
Year	Days of Observation								Year	Days of Observation							
2019	7/20	7/21	7/27	7/28	8/3	8/4	8/10	8/11	2019	8/24	`8/25	8/31	9/1	9/7	9/8	9/14	9/15
2020	7/18	7/19	7/25	7/26	8/1	8/2	8/8	8/9	2020	8/22	8/23	8/29	8/30	9/5	9/6	9/12	9/13
Third Wave (Social Distancing Enforcement: Nov 19 and Dec 8, 2020)																	
Year	Days of Observation								Year	Days of Observation							
2019	10/26	10/27	11/2	11/3	11/9	11/10	11/16	11/17	2019-20	12/14	12/15	12/21	12/22	12/28	12/29	1/4	1/5
2020	10/24	10/25	10/31	11/1	11/7	11/8	11/14	11/15	2020-21	12/12	12/13	12/19	12/20	12/26	12/27	1/2	1/3
Fourth Wave (Social Distancing Enforcement: July 12, 2021)																	
Year	Days of Observation								Year	Days of Observation							
2019	6/15	6/16	6/22	6/23	6/29	6/30	7/6	7/7	2019	7/20	7/21	7/27	7/28	8/3	8/4	8/10	8/11
2021	6/12	6/13	6/19	6/20	6/26	6/27	7/3	7/4	2021	7/17	7/18	7/24	7/25	7/31	8/1	8/7	8/8

Note: The days of observation are provided for four major COVID-19 waves. The mobility reduction rate in the COVID-19 era is calculated by taking the difference between mobility in 2020–2021 to mobility during 2019–2020. Then, each widespread period is separated into reference and treatment periods by the day of enforcement of social distancing policies. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest.

Appendix Table 2: Effect of Political Orientation on Mobility Restriction (Overall Road Traffic, Binary Specification)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
High Approval Rating × Post	1.354	1.809*	1.564
	(1.572)	(1.055)	(1.046)
High Approval Rating [0-1]	2.906	-0.483	1.002
	(2.120)	(1.131)	(1.840)
Post	-7.722***	-25.01***	-10.25***
	(1.436)	(0.990)	(1.080)
Mean of dep. variable	-9.939	-14.25	-12.88
Observations	1,996	1,935	1,985
R-squared	0.572	0.706	0.359
	Panel B: Congressional Election Results (April 2020)		
High Approval Rating × Post	0.998	2.037*	2.653**
	(1.496)	(1.048)	(1.033)
High Approval Rating [0-1]	1.781	-0.778	0.759
	(2.707)	(1.413)	(1.765)
Post	-7.614***	-25.06***	-10.77***
	(1.479)	(1.111)	(1.095)
Mean of dep. variable	-9.939	-14.25	-12.88
Observations	1,996	1,935	1,985
R-squared	0.568	0.706	0.361

Note: Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that results of the widespread of the first COVID-19 outbreak were excluded in the main table since the first wave of the pandemic occurred in Dae-gu, not in Seoul. *** p<0.01, ** p<0.05, and * p<0.1

Appendix Table 3: Effect of Political Orientation on Mobility Reduction (Eliminating Outliers, Binary Specification)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
High Approval Rating × Post	1.205**	0.514	0.501*
	(0.487)	(0.443)	(0.296)
High Approval Rating [0-1]	-0.190	-0.065	0.220
	(0.603)	(0.607)	(0.747)
Post	-23.49***	-26.70***	-15.14***
	(0.499)	(0.386)	(0.394)
Mean of dep. variable	-30.23	-36.67	-30.31
Observations	5,712	5,712	5,712
R-squared	0.836	0.885	0.494
	Panel B: Congressional Election Results (April 2020)		
High Approval Rating × Post	0.811*	0.283	0.615**
	(0.488)	(0.433)	(0.293)
High Approval Rating [0-1]	0.910*	1.356**	0.466
	(0.552)	(0.537)	(0.664)
Post	-23.23**	-26.53***	-15.16***
	(0.505)	(0.383)	(0.397)
Mean of dep. variable	-30.18	-36.62	-30.26
Observations	5,696	5,696	5,696
R-squared	0.840	0.888	0.497

Note: Appendix Table 3 is the estimation results using a binary specification for the main regressor "votes received." Regions are separated into high-approval and low-approval groups using the median level of votes received by the president and the ruling party. Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Appendix Table 4: False Specification Test (Binary Specification)

Variables	(1) Second Wave (Aug.2020 – Sept. 2020)	(2) Third Wave (Nov. 2020 – Jan. 2021)	(3) Fourth Wave (Jul.2021 – Aug. 2021)
	Panel A: Presidential Election Results (May 2017)		
High Approval Rating × Post	-0.289	0.555	0.009
	(0.447)	(0.448)	(0.407)
High Approval Rating [0-1]	-2.203	-3.173	-3.598
	(2.326)	(2.454)	(2.714)
Post	0.832**	0.832**	0.013
	(0.350)	(0.350)	(0.467)
Mean of dep. variable	0.268	-0.040	1.665
Observations	5,922	6,768	5,922
R-squared	0.184	0.229	0.284
	Panel B: Congressional Election Results (April 2020)		
High Approval Rating × Post	-0.131	0.319	0.280
	(0.449)	(0.662)	(0.407)
High Approval Rating [0-1]	-3.252*	-2.423	-3.579
	(1.932)	(1.769)	(2.264)
Post	0.738**	2.795***	-0.155
	(0.366)	(0.741)	(0.475)
Mean of dep. variable	0.324	-0.006	1.750
Observations	5,908	6,752	5,908
R-squared	0.226	0.230	0.284

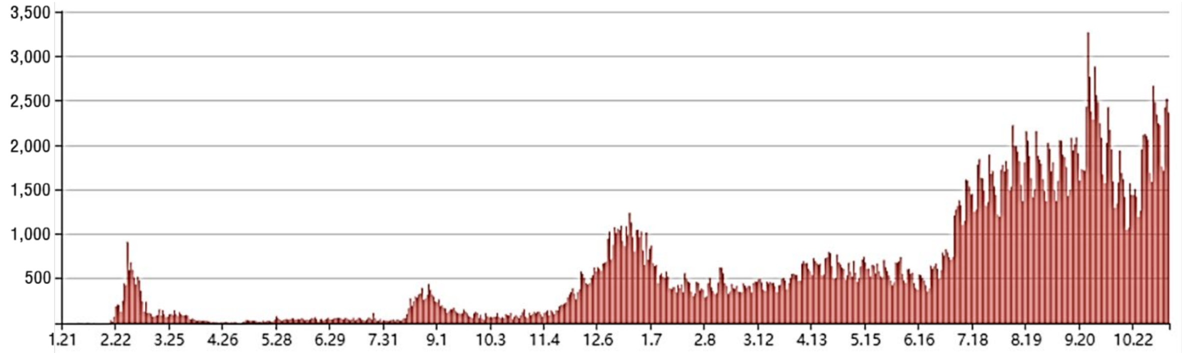
Note: Appendix Table 4 is the estimation results using a binary specification for the main regressor "votes received." Regions are separated into high-approval and low-approval groups using the median level of votes received by the president and the ruling party. Standard errors are clustered by ward and are reported in parentheses. The level of regional fixed effect is determined by 25 districts. Note that the first wave is excluded from the analysis since the widespread had a lesser effect on our region of interest. *** p<0.01, ** p<0.05, and * p<0.1

Appendix Table 5: Effect of Political Orientation on Mobility Reduction by Students and Education

	Number of students (grade 1-12)				Number of private institutions			
	Presidential Election (May 2017)		Legislative Election (April 2020)		Presidential Election (May 2017)		Legislative Election (April 2020)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Low	High	Low	High	Low	High	Low	High
	Panel A: Second COVID-19 Widespread (Aug 2020 ~ Sept 2020)							
Votes Earned × Post	0.359***	0.215***	0.165***	0.100***	0.393***	0.164**	0.091	0.101**
	(0.105)	(0.079)	(0.061)	(0.036)	(0.099)	(0.078)	(0.058)	(0.042)
Mean of dep. variable	-30.30	-30.81	-30.30	-30.73	-30.02	-31.40	-30.02	-31.31
Observations	3,696	3,088	3,696	3,072	4,256	2,528	4,256	2,512
R-squared	0.838	0.836	0.836	0.840	0.840	0.833	0.839	0.837
	Panel B: Third COVID-19 Widespread (Dec 2020 ~ Jan 2021)							
Votes Earned × Post	0.302***	0.290***	0.102**	0.197***	0.280***	0.264***	0.093**	0.190***
	(0.092)	(0.064)	(0.051)	(0.029)	(0.086)	(0.072)	(0.044)	(0.035)
Mean of dep. variable	-36.65	-37.23	-36.65	-37.13	-36.19	-38.12	-36.19	-38.02
Observations	3,696	3,088	3,696	3,072	4,256	2,528	4,256	2,512
R-squared	0.889	0.894	0.887	0.900	0.890	0.893	0.889	0.899
	Panel C: Fourth COVID-19 Widespread (July 2021 ~ Aug 2021)							
Votes Earned × Post	0.182**	0.162***	0.165***	0.088***	0.254***	0.091**	0.149***	0.070***
	(0.084)	(0.031)	(0.043)	(0.015)	(0.071)	(0.038)	(0.038)	(0.018)
Mean of dep. variable	-30.29	-30.81	-30.29	-30.72	-29.96	-31.48	-29.96	-31.37
Observations	3,696	3,088	3,696	3,072	4,256	2,528	4,256	2,512
R-squared	0.509	0.492	0.502	0.491	0.516	0.476	0.508	0.473

Note: Standard errors are clustered and are reported in parentheses. The level of regional fixed effect is determined by 25 districts (gu). Cluster levels are determined by 425 wards (dong). Note that the results of the first widespread of COVID-19 were excluded in the main table since the first wave of the pandemic occurred in Dae-gu and not in Seoul.
*** p<0.01, ** p<0.05, and * p<0.1

Appendix Graph 1: COVID-19 Daily Incident during 2020–2021



Note: Red bars indicate the daily number of COVID-19 infections happening during 2020–2021.