Living in Black and White: Neighborhood Effects During Covid-19*

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Abstract

A body of evidence from across the social sciences finds that, under the same policies, Black neighborhoods experience worse outcomes. Prevailing explanations appeal to institutional or individual-level discrimination. Using the early phase of the Covid-19 pandemic, a setting where discrimination cannot explain differential outcomes by race, we highlight the role of trust deficits caused by racial residential segregation in explaining negative outcomes. In this setting, we find that Black neighborhoods fare worse as well. This result is highly heterogeneous along lines of racial residential segregation - in areas of low segregation, Black neighborhoods had 67.0 additional cases per 100,000 residents. In areas of high segregation, this figure increases by a factor of 2.5. Regarding mechanisms, we find direct evidence of policy inefficacy as mobility decreases (in all categories save grocery) and use of face coverings responded less to policy interventions in segregated areas. These findings cannot be explained by differences in rurality, industrial composition, population density, or by differences in underlying health status. We conclude by suggesting that policymakers should give specific, targeted concern to segregated neighborhoods during times of crises.

Keywords: Ethnic Enclave; Ethnic divisions; Racial segregation; Trust; Government Crisis-response; COVID-19; Lockdown Policies; Interpersonal Preferences; Prosociality

JEL Classification: I18, H75, J15, D63, E61.

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1 Introduction

Recent work in economics has highlighted the importance of place. In the United States, this fact is particularly salient for Black Americans, many of whom have historically been siloed into isolated neighborhoods. In this paper we examine a persistent dilemma — Federal- and county-level policies produce worse outcomes for individuals living in majority-Black areas. Under *the same policy regimes* majority-Black areas have been found to have access to fewer healthcare resources (Mehdipanah, McVay, & Schulz, 2023), have more exposure to lead in spite of policy designed to remediate it (Sampson & Winter, 2016), and be exposed to more environmental pollution despite federal legislation designed to combat it(Currie, Voorheis, & Walker, 2023). Using the flurry of federal and county policies implemented during the early phase of the COVID-19 pandemic in the United States, we find that during this time preventative policies were less effective in Black counties as well. Our preferred explanation for this result is the racial residential segregation prevalent in these counties drives the policy inefficacy we observe. This finding complements our previous work which finds that ethnic divisions played an important role in worsening both cases and deaths in the United States during COVID-19 (Debnam Guzman, Mabeu, & Pongou, 2022).

Our results drawn from the early phase of the COVID-19 pandemic are particularly important because throughout, Black Americans were more likely than members of other ethnic groups to contract COVID, to suffer severe disease from it, and to die (Andrasfay & Goldman, 2021). These differential effects have exacerbated existing racial gaps in life expectancy and maternal mortality. Hypothesized mechanisms tend to focus on individual-level characteristics such as Blacks' job characteristics, prevalence of comorbidities, prevalence of risk factors and access to health care (Magesh et al., 2021). In this paper we consider a place-based mechanism — that negative outcomes for Black Americans were a consequence of less effective preventative public policies in the areas in which they live. Our finding that racial residential segregation drives policy inefficiency contrasts with earlier work studying Black residential areas which highlights the importance of discrimination and accumulated disadvantage in these areas as explanations for differential outcomes. Under our preferred specification, predominantly Black counties had 82.90 more COVID-19 cases per 100,000 residents during this period (s:e: = 14.32) and 3.95 more deaths per 100,000 residents (s.e. = 0.95) following the Federal State of Emergency Declaration. At low levels of segregation, we find that the role of policy inefficiency in driving differential outcomes for Blacks during the early COVID-19 pandemic is cut by a factor of 2.5. These findings are robust to considering other county-level crisis-response policies such as safer-at-home and business closure orders. Importantly, we show that our findings are not driven by a lack of physical public goods, socioeconomic differences, or by the prevalence of high-risk populations in more fragmented counties.[1]

[1]Indeed, our findings are highly robust to controlling for a wide range of factors such as total population, population density, percentage of males, average age, poverty, percentage of adults with at least a high school degree, percentage of urban population, percentage of population born outside of the United States, political ideology or polarization (measured by the share of Trump voters in the 2016 presidential election), and county-

There are several reasons to consider the role of racial segregation in defining COVID-19 outcomes, especially in the U.S. where the formal enforcement of preventative policy measures has been weak. Since members of tight-knit communities have on average more repeated interactions, the Folk theorem suggests that these communities can sustain more prosocial behavior. As others have found when examining preferences for redistribution (Alesina et al. (1999), Luttmer (2001)), residents may be less altruistic towards out-group members. This implies lower incentives to self-quarantine or to wear a face mask for infected individuals living in more racially segregated areas. These possible mechanisms suggest that both the quality and the efficacy of government measures implemented to combat COVID-19 spread may have been negatively impacted by the presence of racial segregation. We therefore directly consider mobility behaviors and mask-wearing, and the effects of different mobility restriction policies on these behaviors, finding that these behaviors are lower in Black counties, and are diminished by residential segregation.

Our first contribution is to the literature on the effect of place on social and economic outcomes. Within this literature, we present evidence that preventative policies were significantly less effective in Black neighborhoods during the early phase of the Covid-19 pandemic. This differential efficacy within Black neighborhoods echoes others' findings in unrelated policy contexts (Sampson & Winter, 2016; Currie et al., 2023). Our exploration of mechanisms highlights that this result cannot be fully explained by discrimination. Instead we show that, in large part, segregation can explain the negative outcomes suffered by those living Black neighborhoods. We also contribute to a growing literature which underscores the importance of race in shaping the economic and disease burden from COVID-19 (c.f. Andrasfay and Goldman (2021), Pongou et al. (2020)). Finally, we contribute to a body of work which emphasizes the importance of social attitudes in mitigating the spread of COVID-19 (Barrios, Benmelech, Hochberg, Sapienza, & Zingales, 2021; Bonaccorsi et al., 2020; Durante, Guiso, & Gulino, 2020; Ding, Levine, Lin, & Xie, 2020).

Our paper significantly differs from the aforementioned studies in its scope, analyses, and policy implications. In fact, we are instead interested in disentangling the role of *ethnic enclaves* from that played by *ethnic division* in the efficacy of government response to crises involving wide-scale externalities. Most importantly, we find that the efficacy of national and county-level policies in curbing the spread of COVID-19 and averting COVID-19 deaths was low primarily in Black ethnic enclaves that are also racially segregated. In addition, residents of more ethnically divided counties were less likely to report wearing face masks. Our findings therefore lead to the conclusion that *ethnic divisions*, rather than *ethnic enclaves*, spurred drastic differences in COVID-19's impact. Our paper is the first to document these results. Our proposed mechanisms suggest that federal policy making and enforcement, which can circumvent local coordination problems, could be a good approach to ensure that best practices are followed. Our analysis also suggests that designing, implementing, and sustaining policies of ethnic and racial integration can broadly improve policy efficacy.

level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke).

The rest of the paper is organized as follows. Section 2 presents the conceptual framework. Section 3 describes the data used in the analysis. Section 4 presents the identification strategy, and Section 5 presents results. Section 6 investigates the different channels through which mobility restrictions and other preventative policies operate. Section 7 concludes.

2 Background

2.1 Predominantly Black Areas and Policy Efficacy

Across a variety of contexts, social scientists find that government resources are less likely to reach Black residential areas and that, conditional on reaching those areas, those policies and resources are less effective. Lester and Wilson (2023) find that Black and Latinx applicants received disproportionately fewer loans during the initial administration of the Paycheck Protection Program during the COVID-19 pandemic. Studying the adoption of solar panels in the United States, Gao and Zhou (2022) find that while solar justice policies implemented by utilities and local governments lead to increased solar adoptions by low-income households, there is not a statistically significant effect of these policies for Black census tracts. The authors attribute this difference to a lack of awareness of the benefits of solar panels among Black households. Burda and Harding (2014) use an econometric technique which attempts to control for observed and unobserved differences in the characteristics of Superfund sites and find that from the beginning of the Superfund program in the 1980s, environmental hazards in Black neighborhoods took longer to cleanup. Following a reform which dispersed residents of public housing assistance across Denver, Anna and Peter (2001) find that while the dispersal increased single family home sale prices in surrounding areas in general, this was not the case in neighborhoods where more than 20% of the residents were Black.

One possible driver of the differential policy efficacy in areas with a high concentration of Black residents is unresponsiveness within the political system to the concerns of individuals living in these neighborhoods. An initial source of such unresponsiveness stems from the individuals positioned to respond to citizen concerns. Several authors use field experiments to send otherwise identical correspondences from fictitious correspondents who differ only in the presumptive race of their names. These authors find authorities less responsive to the requests of respondents with Black-sounding names. For example, Giulietti et al. (2019) send simple queries to more than 19,000 local public service providers and find that emails coming from individuals with Black-sounding names were four percent less likely to receive a reply. In a field experiment, Butler and Broockman (2011) request voting registration information from state legislators using putatively Black and White aliases. They find that Black aliases are significantly less likely to receive a reply from legislators, even when these correspondences signal co-partisanship. Given the experimental methodology by which these results arrive, the authors note that these papers provide strong evidence of discrimination against Black aliases. Within the legal system, predominantly White school districts which use the court system to

appeal to federal law in order to challenge inequitable school financing have a nearly three times higher success rate in court relative to predominantly minority school districts (Ryan, 1999).

An additional source of political unresponsiveness stems from frictions in the voting system. Multiple authors have found a large disparity in wait times to vote across Black and White voting precincts. Pettigrew (2017) find that individuals living in predominantly minority districts wait on average twice as long as individuals living in predominantly White districts to vote, attributed to difference in the way that local election officials do a worse job in serving minority precincts than White ones. Using data from smartphone users, a more recent study by Chen et al. (2022) finds an even greater disparity in voting wait times between Black and White precincts.

Existing work in public health has suggested at least a correlation between the availability of public health resources during the COVID-19 pandemic and an area's racial composition. For example, Asabor et al. (2022) find that in the four most segregated US cities (NYC, LA, Chicago, and Houston), the number of expected COVID-19 testing sites per census block group decreased as the proportion of Black and Latinx residents living in that block group increased. For example, in Chicago (the most segregated city as measured by the dissimilarity index), there was a 3.05% decrease in the number of expected testing sites per block group for every 1% increase in the proportion of residents who were Black, and a 5.64% decrease in the number of expected testing sites per block group for every 1% increase in the proportion of residents who were Latinx. Dalsania et al. examine the link between social factors and mortality during the COVID-19 pandemics shows that as the number of Black residents in a county increases, so does the mortality rate (Dalsania et al., 2021).

Across these studies, authors largely attribute findings to some form of discrimination. And indeed, policy reforms which intentionally targeted biased decision making by policy makers were successful in making some policy outcomes more equal across predominantly Black and predominantly White residential areas. Black residents face $10 - 13\%$ higher property tax burden (Avenancio-León & Howard, 2022). However, a study conducted after a reform in Fulton county Georgia which used statistical methods to re-apprise properties en masse, found that there was no remaining difference in the property tax burdens faced by Black and White residents (Makovi, 2022). This suggests that latent or conscious discrimination on the part of assessors may have been driving the differential. Following the differential receipt of during the first two phases of the Paycheck Protection Program loans by Black individuals, Lester and Wilson (2023) find that changes instituted in the third phase of the program resulted in better targeting individuals living in these areas. Burda and Harding (2014) find that an executive order issued in 1994 which targeted disadvantaged communities lessened the disparity in cleanup times across Black and White communities.

Discrimination, however, cannot fully explain our results. We show that the policy ineffectiveness which followed the implementation of county- and federal-level preventative policies was accompanied by differential responses in mobility. Discrimination may explain Black

counties' decreased access to COVID-19 testing facilities and limited access to pharmaceutical treatments as they became available. It cannot explain individuals' own under-response to policy guidelines. Explanations for this must rest instead on relationships between individuals, their policymakers, and their communities. Institutional distrust, shown to increase with racial residential segregation (Rothwell, 2012a), remains a plausible explanation for predominantly Black counties' under-response to policy during COVID-19. Indeed a meta-analysis has found that communities' trust was consistently an important factor in preventing the spread, morbidity and mortality of COVID-19 (Ruggeri et al., 2024).

2.2 Racial Residential Segregation in the United States

Racial residential segregation in the United States, inexplicable by differences in socioeconomic status across racial groups (Spivak & Monnat, 2013), is most pronounced between Black and White Americans (Acevedo-Garcia, Lochner, Osypuk, & Subramanian, 2003). Decades of empirical evidence using a variety of empirical segregation measures finds that residential segregation in the United States has caused great harm to the economic and health status of Black Americans.

A priori the impact of residential segregation on Black Americanâs outcomes is ambiguous. By its nature, race-based segregation increases the likelihood of interaction between poor and wealthy members of the same racial group. In this way, poor Blacks may theoretically benefit from increased exposure to the human capital and financial resources of wealthy Blacks under segregation (Cutler & Glaeser, 1997a). In practice however, these potential positive spillovers may not occur due to the sorting of high-income Blacks out of segregated neighborhoods. Indeed, Bayer et al. (2014) find that as the proportion of highly educated Blacks in an MSA increases, so does segregation. Potential benefits to racial enclaves may also be outweighed by the negative impacts of the lower quality neighborhoods in which segregated Blacks are more likely to live. For example, majority-Black neighborhoods in the United States are more likely to be targeted by alcohol and tobacco industry advertising, more likely to be subject to environmental pollution, and are more geographically isolated from retailers and potential employers than are other neighborhoods (Acevedo-Garcia et al., 2003).

In theory, race-based residential segregation may also increase the ability of Black Americans living in the same community to organize and to advocate for provision of public goods (Tajima, Samphantharak, & Ostwald, 2018). These residential clusters may also be effectively targeted for benefits by politicians seeking to benefit members of their own groups (Ejdemyr, Kramon, & Robinson, 2018a). However when political boundaries contain multiple clusters of segregated groups, polarization may lead to conflict, gridlock, and insufficient provision of public goods (Trounstine, 2016). The latter effect has been found to dominate in several countries (Alesina & Zhuravskaya, 2011a) as well as in several U.S. cities (Trounstine, 2016).

Higher levels of segregation are associated with lower Black incomes, and with lower rates of Blacks being either in school or employed (Cutler & Glaeser, 1997a; Collins & Margo, 2011). Using railroads to instrument for segregation, Ananat (2011) finds that segregation causes

increased Black poverty and larger disparities between Black and White incomes. Card and Rothstein (2007a) find that a Black student living in a segregated neighborhood has lower SAT scores than an observationally equivalent Black student living in an integrated neighborhood. Racial residential segregation is also associated with a widening gap in homeownership between Blacks and Whites (Collins & Margo, 2011; Logan & Parman, 2017), and with decreased high school graduation rates for Blacks (Guryan, 2004a).

While not causal estimates, observational public health studies have consistently documented a negative impact of segregation on Black life expectancy. Residents living in Black (and White) segregated neighborhoods face increased levels of violence (Peterson & Krivo, 2009a). Relative to Blacks living in integrated areas, Blacks living in segregated areas additionally face higher rates of infant mortality (LaVeist, 1993) and higher rates of adult mortality (Fang, Madhavan, Bosworth, & Alderman, 1998). Debnam Guzman et al. (2022) find causal evidence consistent with the latter during the early stage of the Covid-19 Pandemic. While there is no direct evidence of mechanism in these studies, the authors hypothesize that segregation impacts public health through its effect on neighborhood quality and the accumulation of disadvantage in segregated neighborhoods.

3 Data and Descriptive Statistics

For this study, we combine different datasets covering the period between February 1, 2020 and June 7, 2020. We focus on this period to be able to identify the "causal" effects of early federal and county-level policy responses to the COVID-19 pandemic and analyze how these effects interact with ethnic divisions. We end data collection at June 7, 2020, after which some county-level preventative policies were rescinded and new, overlapping, policies were introduced elsewhere. Analyzing data beyond June 7, 2020 raises the concern of attributing the effects of overlapping policies to early lockdown measures. Data include COVID-19 related cases and deaths, government policies, physical distancing, and socio-demographic characteristics. In this section, we describe the main data sources and highlight the general patterns in the data.

Data on COVID-19 cases and deaths. We obtain county-level daily data on new and cumulative confirmed COVID-19 cases and deaths from USAFacts. USAFacts is a private non-profit group that compiles data from the United States Centers for Disease Control and Prevention (CDC) and from state and local public health agencies. The USAFacts dataset on COVID-19 cases and deaths is a time series database spanning the period from January 22, 2020 to June 07, 2020 (the latest date available at the time the data was downloaded). The cumulative number of confirmed cases is updated each evening. Not every case is reported by county; some are not allocated due to lack of information. The number of missing observations is too small to bias our results (0.73% of observations are missing across all county-days).

Data on national and sub-national government responses to COVID-19. With the spread of COVID-19, federal and local governments in the United States have implemented various non-pharmaceutical interventions. At the federal level, a national emergency was declared by the White House on March 13, 2020.[2] This declaration increased the level of federal funding available for states and localities to respond to the crisis and to expand the scope of their emergency actions as the COVID-19 outbreak continued. We exploit this date to construct a proxy for national emergency declaration, a dummy which equals one on or following the day of the declaration and zero otherwise.

Another metric for national governments' response to COVID-19 crisis is the stringency index obtained from the Oxford COVID-19 Government Response Tracker (OxCGRT) (Hale et al. (2020)), which collects information on a range of physical distancing measures, assigns a score for the measure, and then aggregates this information into a composite stringency index. The stringency index is based on nine response indicators including school closings, workplace closings, the cancellation of public events, restrictions on gathering sizes, closing of public transportation, safer-at-home requirements, restrictions on internal movements and restrictions on international travel. Indicator values are aggregated and rescaled to values from 0 to 100, with a higher index indicating a stricter combination of measures. Importantly, *strictness* is distinct from effectiveness. This index simply records the number and stringency of government policies. The index's authors caution that index scores "should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response".[3] Further details on the OxCGRT database are provided in Hale et al. (2020).

At the county level, data on policy response to COVID-19 are retrieved from the National Association of Counties (NACO).[4] NACO collects a wide range of information on local governments' actions to mitigate the spread of COVID-19, including the onset of county-level emergency declarations and mobility restrictions in response to COVID-19. We construct three measures of sub-national government response to COVID-19 using NACO's information on the dates of county-level implementation of: 1) State of Emergency declarations; 2) closure of all non-essential businesses; and 3) safer-at-home orders, which call for residents to remain at home. Each measure is defined by a dummy equal to one on or following the day of a given policy response and zero otherwise.

Data on social distancing. To capture social distancing behavior we rely on mobility variables compiled by Google Community Mobility reports. These data are collected from users who have opted-in to having their location history tracked by Google. Data were made available by Google. These reports compile data on the percent change in visits to different categories of places such as retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residences. The mobility data show how visits and duration of stay changed relative

[2] Availableathttps://www.Whitehouse.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/

[3] From data description available at https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker/

[4] Available at https://www.naco.org/covid19/topic/research-data

to a baseline for the same areas and same day of the week prior to the virus spread. We extract daily data on mobility from February 15, 2020 to May 29, 2020.

Measuring the Percentage of Black Individuals in a County. The American Community Survey (ACS) collects information about the ethnic and racial composition of a population.[5] Respondents are asked if they belong to any of the following population groups: Hispanic, White, Black, Native American, Asian, Pacific Islander, and Other. We use this information to create a binary variable to identify which counties have a predominantly Black population. If the percentage of Black individuals in a county is over 50%, then the binary variable is coded 1. If the percentage of Black individuals in a county is less than 50%, then the binary variable is coded 0.

Measuring racial residential segregation. A widely used measure of residential segregation is the dissimilarity index (Duncan and Duncan (1955); Massey and Denton (1988); Iceland et al. (2002); Boustan (2012); Graham (2018)).[6] Our focus in this paper is on residential segregation by race, information drawn from the ACS. The dissimilarity index is a measure of the evenness with which two groups (Blacks and Whites in our case[7]) are distributed in a given area (a census tract in the case of the ACS). Conceptually, the White-vs-non-White dissimilarity index, which ranges from 0 (complete integration) to 100 (complete segregation), measures the percentage of a group's population that would have to move to different geographical areas (census tracts) in order to produce a distribution that matches that of the metropolitan area overall (counties in the ACS). This index therefore shows to what extent two subgroups are isolated from one another. In the literature, the Dissimilarity Index (DI) is given by the formula:

$$DI = \frac{1}{2} E[|\frac{s(Z)}{Q} - \frac{1 - s(Z)}{1 - Q}|] \tag{2}$$

where Z is the proportion of census tract z that is minority and Q is the county-wide frequency of minority residents. Graham (2018) shows that DI equals the proportion of a county's minority residents who would need to move in order to achieve perfect residential integration, *relative* to the proportion of a perfectly segregated county's residents that would have to move to achieve perfect residential integration.

Other social and economic characteristics. Demographic and economic variables come from the ACS. Throughout, all socio-economic variables are an average across five years of ACS data collection ending in 2018. For the purpose of this paper, the following county-level statistics and indices are extracted from the ACS: population size, population density, unemployment

[5] For all analysis involving ACS data, we rely on the 2018 round of the American Community Survey, the most recent year for which data is available.

[6] Massey and Denton (1988) identified five measures of residential segregation: dissimilarity index, isolation index, delta index, absolute centralization index, and spatial proximity index.

[7] We also replicate the analyses using a measure of White/Non-White segregation. We find less striking results in this case.

rates, foreign-born population, gender distribution of population, average age of the population, educational attainment, urban-rural distribution of the population, and poverty rates. We also use information about the health characteristics of counties including the percentage of adults reporting: fair or poor health, smoking, obesity, and diabetes. We also control for political ideology and polarization, measured by the share of Trump voters in the 2016 presidential election at the county level.

To examine the relationship between government response to the pandemic, and COVID-19 cases and deaths (measured both in terms of levels and rates) in predominantly Black counties versus other counties, we merge the datasets described above and drop daily observations with missing data on the percentage of Black individuals in the region, confirmed cases of COVID-19, or government policy indexes. The refined sample consists of 285,522 daily observations from 3,143 counties spanning the period from January 22, 2020 to June 07, 2020. Table 1 reports descriptive statistics of the variables of interest in our sample.

4 Identification Strategy

To assess policy effectiveness in Black counties, as compared to other counties, we observe the interaction between COVID-19 cases and fatalities and government policy. We rely on two main methodologies. The first approach is a pre-post analysis that exploits the timing of the federal State of Emergency declaration to compare the main outcomes of interest before and after the policy announcement. This approach is useful because the policy does not vary at the county level for a fixed date. However, it lacks an appropriate comparison group in the post period. We therefore advance our analysis using a difference-in-differences (DiD) strategy which evaluates the efficacy of staggered county-level mobility restrictions.

Under the DiD strategy, counties that did not implement mobility restriction policies serve as counterfactuals for counties that did. This strategy exploits the differential timing of policy implementation and controls for various confounding factors, making it possible to identify the causal impact of mobility restrictions. In addition to these two approaches, we perform an event-study analysis and an in-time placebo robustness check.

4.1 First Approach: Pre-Post Analysis

Using the federal State of Emergency declaration, we first implement a simple pre-post analysis at the national level. Specifically, we estimate the following OLS regression:

$$\begin{aligned} \mathsf{Covid}_{cst} = \lambda_0 + \lambda_1 \mathsf{NationalPolicy}_t + \lambda_2 \mathsf{BlackRate}_{cs} + \lambda_3 \mathsf{NationalPolicy}_t \times \mathsf{BlackRate}_{cs} \\ + \alpha_z + \delta_t + \mathbf{X}_{cs}^{'}\pi + \varepsilon_{cst} \end{aligned} \tag{1}$$

Where Covid_{cst} is the outcome of interest, which is alternatively the rate of COVID-19

cases or deaths in county c of state s on date t divided by the total population of county c. $\mathtt{NationalPolicy}_t$ refers to the United States federal government's response to the pandemic. This variable is measured in two ways. First, we exploit the timing of the national emergency declaration to define $\mathtt{NationalPolicy}_t$ as a dummy equal to one for dates t greater than or equal to March 13, 2020 (the date on which the White House declared a federal State of Emergency), and zero otherwise. In a second specification, we use the Ox-CGRT stringency index which records how the strictness of the federal policy response has varied over the course of the pandemic (see description of this variable in the data section). In this case, $\mathtt{NationalPolicy}_t$ is a continuous variable taking a value between 0 and 100. The next regressor, $\mathtt{BlackRate}_{cs}$, is the binary indicator that equals 1 if county c in state s has a predominantly Black population and 0 otherwise. This indicator is constructed as described in Section 3.

In alternative specifications, α_z is a set of county or state fixed effects to control for time-invariant unobserved heterogeneity at the county or state level. A set of time dummies to account for common trends is included in δ_t. Finally, $\mathbf{X}_c$ is a vector of county-level characteristics that correlate with the outcome of interest. This allows us to control for potential confounders including county-level demographic characteristics (i.e. population density, percentage of males, average age, poverty, percentage of adults with at least a high school degree, percentage of urban population, and percentage of population born outside of the United States) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). Since the residual ε_{cst} is likely to be correlated for observations in the same state, we adjust standard errors for clustering at the state level.

The parameters λ_1 and λ_2 show the effect of federal policy and the effect of being present in a predominantly Black counties on COVID-19 cases and deaths. The main coefficient of interest is λ_3, the coefficient of the interaction term between federal policy and being in a predominantly Black county. This term measures how the effect of federal policy interventions is modulated by counties' and the predominant race of the population.

4.2 Second Approach: Difference-in-differences Analysis

Our second methodology exploits the staggered nature of county-level mobility restriction policies to conduct a double difference design that exploits within-county variation in the main outcome of interest before and after the policy implementation across treated and untreated counties. Specifically, we estimate the following difference-in-differences specification:

$$\begin{aligned}\mathtt{Covid}_{cst} = \lambda_0 + \lambda_1 \mathtt{CountyPolicy}_{cst} + \lambda_2 \mathtt{BlackRate}_{cs} + \lambda_3 \mathtt{CountyPolicy}_{cst} \times \mathtt{BlackRate}_{cs} \\ + \alpha_z + \delta_t + \mathbf{X}'_{cs}\pi + \varepsilon_{cst}\end{aligned} \tag{2}$$

Where all the regressors are defined as in the previous section save the explanatory variable $\mathtt{CountyPolicy}_{cst}$ which refers to COVID-19 related policies implemented at the county level. For each of three mobility restriction policies, the dummy variable $\mathtt{CountyPolicy}_{cst}$ equals

one for dates on or after the onset of that county-level policy (in county c of state s). In our preferred specification, the variable $\mathtt{CountyPolicy}_{cst}$ is based on county-level declarations of a State of Emergency. In two other specifications we construct $\mathtt{CountyPolicy}_{cst}$ based on the implementation of non-essential business closure policies and on the implementation of safer-at-home orders.

Our key assumption is that, conditional on controls, the evolution of COVID-19 cases and fatalities for counties that implemented preventative policies would not have been different from those which did not. This is equivalent to an assumption of parallel trends in COVID-related health outcomes for treated and untreated counties.

We also implement the two identification strategies described above while replacing our indicator for Black counties by an indicator for the racial residential segregation across the neighborhoods within each counties. Moreover, we estimate the effect of Black counties on COVID-19 outcomes for above-median and below-median levels of racial residential segregation to analyze how the effects of predominant Black communities on these outcomes vary with racial segregation.

4.3 Additional Robustness Checks

Finally, we conduct a number of additional robustness checks related to the above strategies. First, we analyze the dynamic effect of the interaction between Black counties and State of Emergency declarations on COVID-19 outcomes. In another robustness check, we estimate our two main specifications using a fictitious "policy date" 45 days after the true date. Finally, we estimate an event study model to test the parallel trends assumption in our DiD model. We use an event study regression model to examine how county-level COVID-19 related health outcomes evolve during the period leading up to and following county-level mobility restrictions:

$$\mathtt{Covid}_{cst} = \lambda_0 + \sum_{t=-40}^{80} \lambda_{1(t+10)} P_{cs(t+10)} + \lambda_2 \mathtt{BlackRate}_{cs} + \sum_{t=-40}^{80} \lambda_3 P_{cs(t+10)} \times \mathtt{BlackRate}_{cs} + \alpha_z + \delta_t + \mathbf{X}_{cs}^{'}\pi + \varepsilon_{cst} \tag{3}$$

Where $P_{cs(t+10)}$ are dummy variables for the $t+10$ days before the policy for positive values and the $t+10$ days after the policy for negative values. The period from the beginning of data collection until thirty one days before the mobility-restricting policy is the reference period. For example, the estimated coefficients on the $P_{cs(20)}$ dummies should therefore be interpreted as the effect of being twenty days after the policy as compared to the period ending thirty one days before it.

5 Results

In this section, we summarize our main estimation results. We find that while government responses were effective in slowing the spread of COVID-19 and averting deaths, they were much less effective in counties with a predominantly Black population; this is particularly true in highly segregated areas.

5.1 Emergency Declarations, Black Counties, and COVID-19

5.1.1 Main Results

We begin our analysis with a graphical illustration of the interplay between county-level emergency declarations, predominantly Black counties, and the number of new COVID-19 cases and deaths. Figures 1-*a* and -*b* show the trends in the number of new COVID-19 cases and deaths by the percentage of Black individuals. On the x-axis of each figure, we report the distance (in days) from the county-level State of Emergency announcement (CSOE). These graphs compare the average number of daily new COVID-19 cases (Figure 1-*a*) and deaths (Figure 1-*b*) in counties with an above-median percentage of Black individuals ("predominantly Black counties") and below-median percentage of Black individuals ("non-predominantly Black counties"). These graphs clearly illustrate that following county-level State of Emergency declarations, the number of new COVID-19 cases and deaths increased substantially more in counties that are predominantly Black. These observed differences suggest an important differential effect of mobility restrictions in these counties.

These results are confirmed in the regression-based analysis in Table 2. In this table we present estimates of the impact of mobility restriction policies, living in a predominantly Black community, and their interaction on COVID-19 outcomes. The first two panels of this table display results of the pre-post analysis using the Federal State of Emergency as a measure of mobility restriction policy (see Equation (1)). The two panels at the bottom of the table show estimates of the difference-in-differences analysis that use the county-level State of Emergency as a measure of mobility restriction policy (see Equation (2)). Notice that the positive association between the mobility restriction policy and COVID-19 outcomes also indicate that the number of infected individuals and deaths continued to rise following both the federal and county-level emergency declarations, suggesting that these policies might not have been uniformly effective. The outcome of interest is the cumulative number of COVID-19 cases per $100,000$ people in Panels A and C, and the cumulative number of COVID-19 deaths per $100,000$ people in Panels B and D. Estimates in Column (1) show the average effects of mobility restriction policies and living in a predominantly Black county on COVID-19 outcomes. In both the pre-post analysis and the double difference analysis, we find that living in a predominantly Black community is associated with an increase in COVID-19 cases and related deaths. These effects are both economically and statistically significant. In fact, predominantly Black counties had 82.90 more COVID-19 cases per $100,000$ residents ($s.e. = 14.32$) and 3.95 more

deaths per 100,000 residents (s.e. = 0.95) following the Federal State of Emergency Declaration. These numbers are 74.15 (s.e. = 20.81) and 3.54 (s.e. = 1.15) respectively in the double difference analysis.

In Column (2), we add an interaction between the Black county indicator and the mobility restriction policy. In *Panels A* and *B*, we find that the effect of the mobility restrictions on COVID-19 outcomes is positive, and the interaction between mobility restriction policy and the predominantly Black county indicator is highly positive and statistically significant. Estimates in Column (2) of Table 2 show that counties with a predominantly Black population had COVID-19 cases which were higher by 131.50 per 100,000 (s.e. = 22.72) following the federal State of Emergency declaration (and deaths which were higher by 6.27 per 100,00 (s.e. = 1.51)), and by 124.94 per 100,000 (s.e. = 35.32) (and deaths which were higher by 5.96 (s.e. = 1.95)) following the county-level State of Emergency declaration. This means that government policy responses to COVID-19 were less effective in preventing infections and deaths in counties with a majority Black population. In Column (3), we add state fixed effects to control for time-invariant state-level observed and unobserved characteristics, and day fixed effects to control for any day-specific shock common to all counties (including national trends in COVID-19 incidence). The results remain the same.

We account for potentially confounding factors (e.g. demographic and economics factors which are both linked to the spread of COVID-19 incidence and Black population) in two ways. First, in Column (4), we control for a set of county-level demographic characteristics, including population density, percentage of males, average age, poverty, education, percentage of population living in urban areas, and the percentage of immigrants. We also control for county-level health characteristics, including the percentage of adults in poor health, the percentage of adults who smoke, the percentage of adults with obesity and the percentage of adults with diabetes. Adding these controls does not change the main result: both federal and county-level State of Emergency declarations remain less effective in preventing COVID-19 cases and deaths in counties that are predominantly Black. Interestingly, the coefficient of the Black indicator is negatively associated with COVID-19 outcomes when accounting for state-fixed effects, day-fixed effects and controls in both the pre-post and the double difference analyses (see estimates in Column (4) of Table 2). This is in contrast with the positive effect in Column (3) of the same table. An interpretation for these results is that the positive effect of living in a predominantly Black county on COVID-19 outcomes pre-policy is likely mediated by some of the county-level socioeconomic characteristics for which we control. However, these same characteristics do not seem to play any significant mediating role post-policy. Our second approach to addressing confounding factors is by controlling for county and day-fixed effects in Column (5) (which therefore subsumes all the controls of Column (4)). Throughout all specifications, we find that the interaction between mobility restrictions and predominantly Black counties has a positive and statistically significant effect on COVID-19 outcomes. This suggests that both federal and county-level State of Emergency policies had a significantly constrained effectiveness in predominantly Black county populations.

While less causal, we also study the dynamics of the effect of mobility-restricting policies' interactions with the Black population index. To do so, we consider different bandwidths around the date of the federal and county-level State of Emergency declarations. The estimated coefficients of the interaction terms between the federal State of Emergency and the Black community indicator, and the county-level State of Emergency and Black community indicator are represented under increasingly large bandwidths in Figure 2. We find suggestive evidence that the ineffectiveness of federal and county-level mobility restrictions in averting new COVID-19 cases and deaths in predominantly Black counties increases over time. These results indicate that mobility restriction policies generated sharp and increasing inequalities in COVID-19 outcomes between counties with a high population of Black individuals and those with lower proportions of Black residents.

5.1.2 Robustness

As discussed in Section 4, our DiD methodology assumes parallel trends in the outcome of interest between treated and control groups in the pre-policy period. To consider potential violations of common trends, we conduct an event-study analysis of COVID-19 cases and deaths (Figure 3. We find no statistically significant evidence of a differential effect of mobility restriction policies in predominantly Black counties during the days prior to the county-level State of Emergency declaration. Each point estimate is also near zero. Following the policy date, the estimated effect of the interaction between county State of Emergency and Black population indicator on COVID-19 cases and deaths increases, becoming largest after 80 days following the emergency declaration. These findings are consistent with a causal interpretation of our findings in Table 2. We further validate our results by conducting an in-time placebo test. We create a fictitious policy 45 days after the true emergency declaration date, whether at the federal or county level. The estimates of the effect of the interaction between the fictitious date of the State of Emergency declaration and the Black county indicator are reported in Figure 4 for different bandwidths around this date. We do not find any significant differential effect of mobility restrictions on COVID-19 cases or deaths in highly Black populated areas. The estimates are small and statistically indistinguishable from zero for both the federal and county emergency declarations, for all bandwidths. This clearly contrasts with the results displayed in Figure 2 showing the dynamics of these effects under the true policy date.

To ensure that our findings are not due to a high prevalence of risk factors associated with COVID-19 in predominantly Black counties, we assess the pairwise intersection of the Black population rate with the demographic, economic and health factors listed above. The coefficients of correlation are reported in Column (1) of Appendix Table A1. In order of importance, the Black population rate is positively associated with county level urbanity, poor health, poverty, diabetes, proportion of immigrants, smokers, obesity, and population density; and it is negatively associated with the average age of the county population, level of education, and percentage of males. Reassuringly, almost all of these variables account for less than 25% of the variance in the Black indicator population. A notable exception is for urbanity and

poor health which account for 33% and 29% of the variance in the Black community indicator, respectively. In addition, we regress the Black indicator on COVID-19 related risk factors and collect the residual from the regression to find that the latter accounts for a large amount (87%) of the variance in the Black indicator variable. The correlation between the residual and the Black population indicator is slightly stronger when we use a residual from a fitted regression between the Black indicator and the three most important risk factors defined using a Principal Component Analysis (PCA). These results imply that our estimates are not driven by prevalence of COVID-19 related risk factors in counties which are highly populated by Black residents.

For robustness, we also consider an alternative measure of the federal policy response to COVID-19. Using the pre-post analysis specification in Equation (1), we replace the timing of the federal State of Emergency announcement with an index measuring the degree of stringency of the federal policy response to COVID-19 (see description in Section 3). Results are reported in *Panels A* and *B* of Table 3. Consistent with the results in Table 2 we find that government response to COVID-19, as captured using these alternate measures of intervention, was less effective at reducing COVID-19 infections and deaths in counties with a predominantly Black population.

In addition to county-level state of emergency declarations, county governments also implemented several other policy measures to reduce COVID-19 infections. For instance, governments declared safer-at-home orders and business closures. In a second sensitivity analysis, we assess the interplay between the announcement of these alternative mobility restriction measures and the predominantly Black county indicator. Results are summarized in *Panels C-F* of Table 3. Our main conclusion that mobility restriction policies were less effective at reducing COVID-19 cases and deaths in counties with a predominantly Black population remain the same. When we consider alternative mobility restriction policies including safer-at-home orders and business closures, the findings are qualitatively similar and the magnitude of the effect is stronger than in the main results (see *Panels C-F* of Table 3).

5.2 Emergency Declarations, Black Counties, Racial Segregation, and COVID-19

5.2.1 Main Results

We now document the effect of racial residential segregation on the differential policy efficacy in predominantly Black counties documented above. Similar to Figures 1-*a* and 1-*b*, Figures 5-*a* through 5-*d* plot the trends in the average number of new daily COVID-19 cases and deaths in counties according to their number of Black residents (whether or not they are "predominantly Black") and their level of racial segregation (whether they are above- or below-median) for the days before and after the county-level State of Emergency declaration. What clearly emerges is that following the county-level State of Emergency declarations, there is a substantial increase in the number of new COVID-19 cases and deaths in more segregated

counties with a higher population of Black individuals, suggesting that State of Emergency policies are significantly less effective in reducing the spread of COVID-19 in counties with a high level of racial segregation, especially if the county has a predominantly Black population.

Regression analyses in Table 4 underscore the magnitude of these effects. *Panels A* and *B* of this table summarize the effects of having a majority Black population in a county, the federal State of Emergency declaration, and their interaction on the rates of COVID-19 cases and deaths separately for counties with below-median and above-median levels of residential segregation. Following the emergency declaration, the marginal effect of being in a predominantly Black county with high levels of residential segregation is at least *1.4 times* the marginal effect of predominantly Black counties with low residential segregation across all specifications. In our preferred specification (shown in Columns 3 and 4), within highly segregated counties, moving into a predominantly Black county is associated with a statistically significant increase of 164.7 ($s.e. = 35.35$) cases per $100,000$ residents following the federal State of Emergency declaration, but by an increase of only 67.0 ($s.e. = 24.47$) cases per $100,000$ residents within low-segregation counties. Among predominantly Black counties, following the federal declaration, there were 8.52 ($s.e. = 2.24$) more deaths in ares of high residential segregation and increases of 4.30 ($s.e. = 1.57$) more deaths in low-segregation counties.

This pattern — that preventative policies are drastically less effective in areas of high-segregation relative to areas of low-segregation — holds for COVID-19 cases and deaths following the institution of county-level State of Emergency policies as well. Living in a highly segregated predominantly Black county following county-level State of Emergency is associated with 140.9 ($s.e. = 46.6$) additional cases and 8.31 ($s.e = 2.3$) additional deaths compared to only 101.87 ($s.e. = 49.4$) additional cases and 3.64 ($s.e. = 2.7$) additional deaths in a low-segregation counties. These results remain the same when using alternative measures of mobility restrictions as we can see from estimates in Table 5.

5.2.2 Robustness

Figure 6 and Appendix Table A2 summarize the effects of being a predominantly Black county on the effectiveness of mobility restriction policies, disaggregating by decile of racial residential segregation. For each decile of residential segregation, *Panel A* of Figure 6 reports the coefficient of a regression of cases of COVID-19 on the interaction of being in a predominantly Black community and the federal State of Emergency declaration and the coefficient of a regression of cases of COVID-19 on interaction between predominantly Black counties. Both regression specifications include controls for: county-level characteristics (i.e. total population, percentage of males, average age, poverty, education, urban area, the percentage of immigrants, share of Trump voters), and county-level health characteristics (i.e. the percentage of adults with obesity, "poor health", diabetes, and who smoke), the interacted measures separately, as well as for state and day fixed effects. *Panel B* of Figure 6 reports the same information for deaths associated with COVID-19. Coefficient estimates suggest that the Black county indicator has

a non-positive effect on the efficacy of both the federal State of Emergency declaration and on county-level State of Emergency declarations. As the decile of residential segregation increases, the negative impact of being a predominantly Black community on mobility restriction policies increases as well; the top three highest deciles have the highest death rates. There were 105 more cases of COVID-19 and 11 more deaths in the highest quintile of the Black community rate than in the lowest quintile following the federal declaration.

6 Mechanisms

In this section, we document possible mechanisms through which being situated in a predominantly Black county may have reduced the effectiveness of containment policies. First, we analyze how community ethnicity matters for compliance with mobility restrictions. We next describe the relationship between Black communities and the use of masks following the implementation of mobility-restricting policies. Finally, we provide evidence that higher Black rates in a county reduce the prevalence of membership associations potentially rendering communication more sparse, prosocial norms weaker, and the ability of communities to enact social sanctions reduced.

6.1 Mobility Evidence of Restriction Policies' Efficacy

We have shown that counties with a high Black population have been negatively impacted with increased number of COVID-19 cases and deaths, and there is reduced efficacy of public policies aimed at mitigating these negative outcomes. These discrepancies are heightened in areas that are more racially segregated. In this section we provide direct evidence of lockdown policies' decreased effectiveness in counties with high Black populations— the mobility impacts of State of Emergency declarations. We explore multiple mobility variables which measure change in visits to: (1) retailers and recreational outlets; (2) groceries and pharmacies; (3) parks; (4) transit stations; (5) work places; and (6) residences. Time spent at some locations was directly impacted by lockdown policies which closed physical businesses (i.e. retail and recreation, workplaces), while others remained open under emergency declarations (i.e. groceries, pharmacies, parks, transit). While mobility changes in the former set of locations may reflect the stringency of local legislation, mobility changes in the latter set of locations represent voluntary changes in response to COVID-19 risk. Examining mobility in these locations provides a measure of voluntary personal and prosocial risk reduction.

Our mobility variables are adjusted for COVID-19 cases and deaths. Indeed, while an individual might change their mobility behavior in response to mobility restriction policies, behavioral change is also likely to be endogenous to COVID-19 prevalence in their neighborhood. We account for this endogeneity by computing the ratio of a given mobility variable at time t to the accumulated number of COVID-19 cases at time t. We then estimate the effects of policies on the variables thus generated and analyze how these effects vary by level of ethnic divisions.

A graphical description of the findings is presented in Figure 7. This figure shows that county-level emergency declarations were successful at increasing self-quarantining. Mobility levels dropped following emergency declarations, but mobility in certain categories including visits to workplaces, transit stations, and retail and recreational outlets increased soon thereafter (though not reaching pre-emergency declaration levels in general). In addition, the efficacy of the emergency declaration was higher in counties where the Black population is low. Prior to the declaration, counties with low and high population of Black individuals had similar mobility levels. Following the emergency declaration, mobility dropped more in counties with low percentage of Black communities.

We confirm these descriptive findings in a regression-based framework. We estimate equations (1) and (2), where the dependent variable is any of the aforementioned mobility variables. As in Section 5, we consider both national and county-level State of Emergency policies. Our results are presented in Tables 6-9. In Table 6, we analyze the effect of the national emergency declaration on different categories of mobility. We find that the national emergency declaration increases visits to residences (Column (1) of Panel F) and decreases all of the other categories of mobility (Column (1) of Panels A-E). However, the efficacy of this policy at reducing mobility is much lower in counties with higher levels of Black individuals. Indeed, the effect of the interaction term between the national emergency declaration and the Black rate indicator is positive for all categories of mobility (Columns (2)-(5) of Panels A-E) except visits to residential places for which the effect is negative (Columns (2)-(5) of Panel F). When we consider county-level emergency declarations (Table 7), the findings are qualitatively similar.

In Table 8, we analyze the interacting effect of the national emergency declaration and the Black county indicator by level of residential segregation. We find that this effect is much higher in highly segregated counties, except when the outcome variables are visits to groceries and pharmacies and visits to parks. In general, these findings imply that the efficacy of policies aimed at curbing the spread of COVID-19 is even much lower for more counties with high Black populations that are also more racially segregated.

6.2 Mask-wearing and Racial Communities

In this section, we analyze how Black communities adopted a related preventative policy, mask-wearing, in U.S. counties.

Our data on mask-wearing come from county-level estimates released by the New York Times, and are available only for the month of July 2020. This variable is measured at the county level and represents the proportion of individuals who use a mask to cover their face when they are outside of the home. Because these data were only collected after most mobility-restricting measures were in place, we cannot analyze how these policies affected face covering. However, we believe that observing the correlation between face covering and Black communities is likely to shed additional light on how the latter used these tools and the corresponding efficacy of preventative policies.

We regress mask-wearing on the Black county indicator and on residential segregation (Table

10). All specifications include state fixed effects. The estimate reported in Column (1) implies that people living in counties where the Black population makes up over 50% of the individuals are 2 percentage points less likely to report "frequently" wearing a mask than are people living in the counties with a less than majority Black population. In Column (2), mask-wearing is regressed only on Black-White residential segregation. The estimate implies that living in a county with the highest level of racial segregation rather than a county with the lowest level of racial segregation decreases the frequent use of masks by 0.9 percentage points. Column (3) includes controls for both variables. We note that the effect of being in a predominantly Black community decreases while that of Black-White segregation increases. The reduction in the effect of being in a highly populated Black county can be explained by the drop of observations for which the value of Black-White segregation is not available. In Column (4), we regress mask-wearing on the index of segregation between Whites and others, uncovering an effect that is larger (-3.7 percentage points) than that of Black-White segregation. When both the Black county indicator and the index of segregation between Whites and others are controlled in Column (5), we see that each has a negative and significant effect on mask-wearing. Overall, these findings show that predominantly Black counties did not wear masks frequently during the COVID-19 pandemic, which provides another channel through which they might have weakened the effectiveness of preventative policies in higher Black population counties of the United States.

6.3 Membership Associations in Predominantly Black Counties

In this section, we provide some evidence that there is reduced social association in predominantly Black counties *only in the presence of racial residential segregation*. Weaker social cohesion renders communication more sparse and prosocial norms weaker, reducing the ability of communities to enact social sanctions. Indeed, the ability of communities to enforce policies critically depends on how internally cohesive and well-integrated they are. Social cohesion facilitates communication and makes it easier to define common rules and expectations during a pandemic like COVID-19. Better communication can also facilitate the implementation of preventative policies like contact tracing.

In Appendix Table A3, we analyze how the effect of being in a Black county on social association rates–measured as the number of membership associations per 10,000 individuals in a county– varies by level of racial segregation. Data on social association rates are obtained from 2017 County Health Rankings, the most recent year for which data are available. We regress social association rate on the Black county indicator for each decile of Black-White residential segregation, and report the estimates in Appendix Table A3. We find that being in a Black community decreases social association, but that this negative effect is driven by racial segregation. When the level of racial segregation is low, being in a Black community has no statistically significant effect on social association, but its effect is larger and statistically significant in areas with sufficiently high levels of racial segregation. Living in a county with an above median proportion of Black residents is associated with an increase of 0.53 membership

associations per $10,000$ ($s.e. = 1.19$) in counties in the first decile of racial segregation, and is associated with a decrease of 1.50 per $10,000$ ($s.e. = 0.87$) in the number of membership associations within the tenth decile of Black-White segregation.

These results are consistent with the earlier reported findings that the reduced effectiveness of mobility-restricting policies associated with predominantly Black communities is almost entirely driven by racial residential segregation. Altogether, our analysis suggests that being present in a predominantly Black county weakened mobility restriction measures *only in areas where interracial interactions and social associations are absent.*

7 Conclusion

Beyond the simple aggregation of individual-level characteristics, we find evidence that regional characteristics alter policy efficacy. Using data from the early stage of the COVID-19 pandemic in the United States, we consider two demographic measures which characterize a region – ethnic identity (whether a county is predominantly Black) and ethnic divisions (racial residential segregation). We find strong evidence that policies were less effective in the presence of ethnic divisions, particularly in counties densely populated by Blacks which were already vulnerable.

We find that while areas highly populated by Blacks fared worse in both COVID-19 cases and deaths after federal and county-level State of Emergency declarations, these effects are driven by the response of counties with high levels of racial residential segregation in highly segregated counties than in more integrated counties. In areas with high levels of ethnic divisions, there were smaller mobility reductions in response to federal and county-level policies. Despite higher disease prevalence, residents of these areas were less likely to report frequently wearing a mask.

Our analysis therefore suggests that in crises in which externalities play an important role, ethnicity matters only inasmuch as it presents a barrier to interactions between groups. Racial residential segregation forms such a barrier. Where group divisions exist, communication is sparser, pro-social norms are weaker, and communities are less able to enforce government programs (e.g., mobility restrictions) by enacting social sanctions. Further, the delegation of COVID-19 management to states and localities meant that local group divisions could hinder policy production and public goods provision. All of our proposed mechanisms suggest that three policy measures. First, that federal policy making and enforcement, which can circumvent local coordination problems, could be a good approach to ensure that best practices are followed. Second, our analysis suggests that policies which promote ethnic and racial integration could ameliorate the efficacy of government response to, and allay the negative social and economic impacts of, crises characterized by wide-scale externalities. Finally, we suggest that policymakers place targeted attention on segregated communities.

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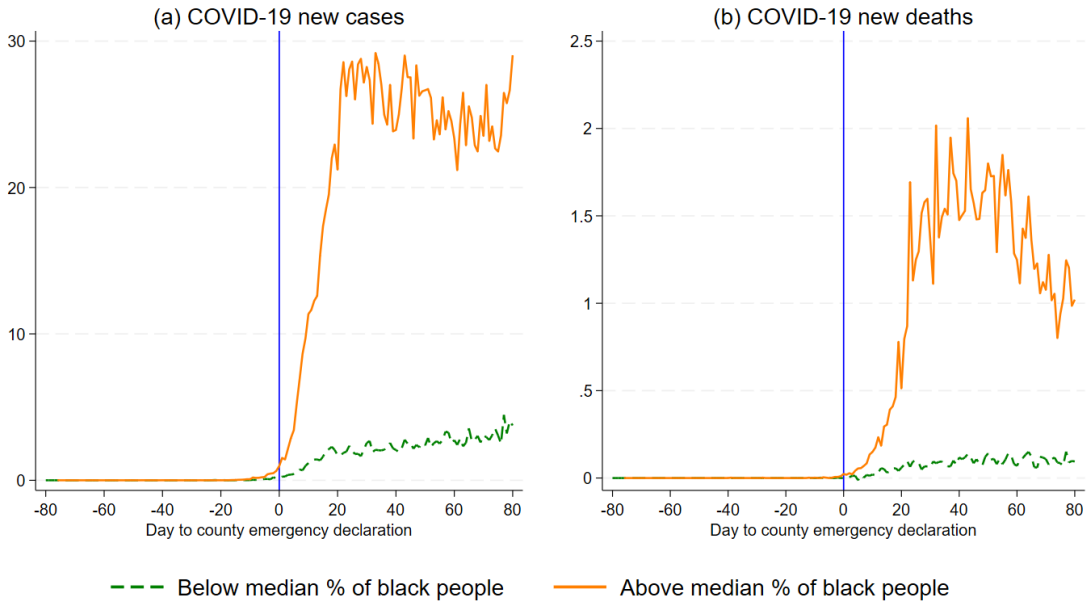
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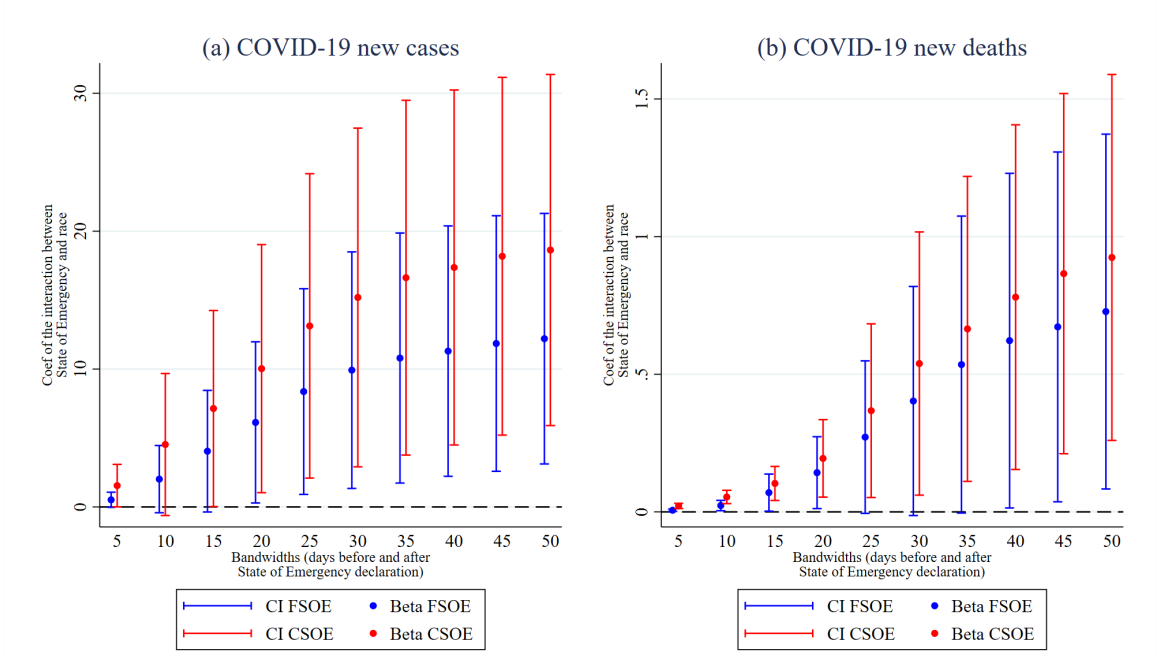
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Figure 1: COVID-19 and county-level emergency declaration by race



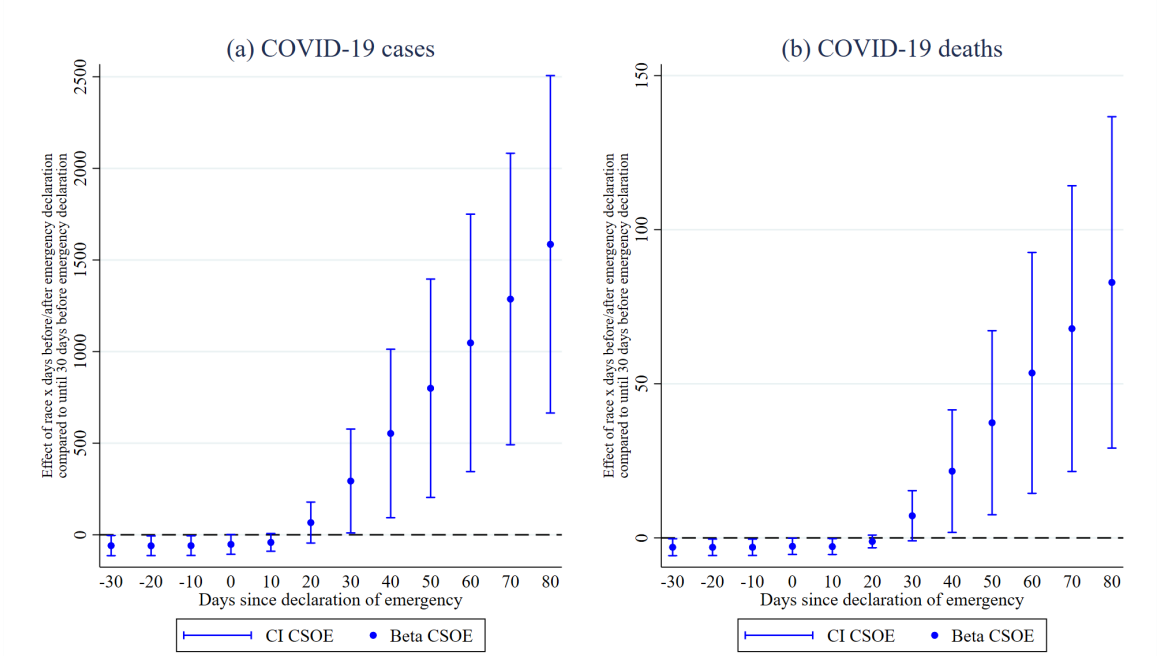
Note: Panel (a) of Figure 1 plots the average number of daily COVID-19 cases in counties in the U.S. relative to the date of their county-level State of Emergency declarations (denoted by the blue line at zero). The average number of new daily cases in the days preceding and following the county-level State of Emergency declarations is shown separately for counties with above-median percentage of Black people (shown in orange) and below-median percentage of Black people (shown in green). Panel (b) of Figure 1 plots the equivalent statistics for average daily deaths attributed to COVID-19 relative to the date of county-level State of Emergency declaration.

Figure 2: Dynamic of the effect of the interaction between emergency declarations and race on COVID-19 outcomes



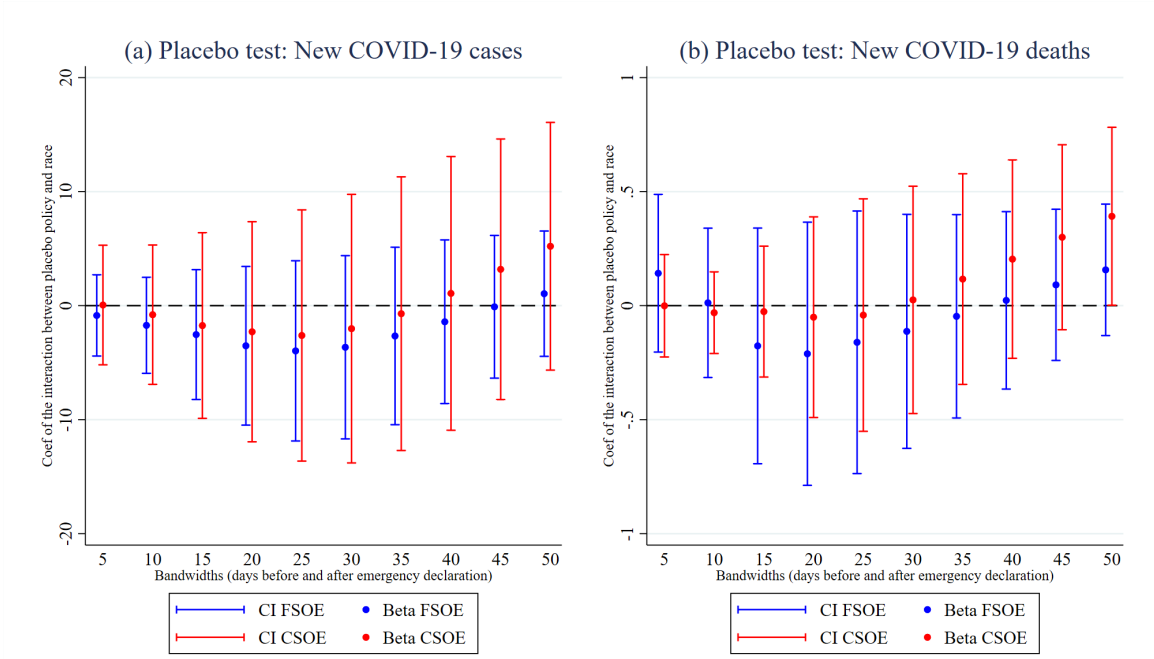
Note: Figure 2 summarizes, for different bin sizes around the policy dates, the regression coefficients and 95% confidence intervals of the interaction term between the Federal State of Emergency Declaration and race when equation 1 is estimated (denoted by FSOE, shown in blue), and the regression coefficient of the interaction term between the county-level State of Emergency Declaration and race when equation 2 is estimated (denoted by CSOE, shown in red). For example, 5 on the x-axis indicates a bin size of five days before and after the lockdown. Panel (a) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 cases. Panel (b) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 deaths. All specifications include county and day fixed effects. Standard errors are clustered at the state level

Figure 3: Event-study estimates of the effect of the interaction between county-level emergency declaration and race on COVID-19 outcomes



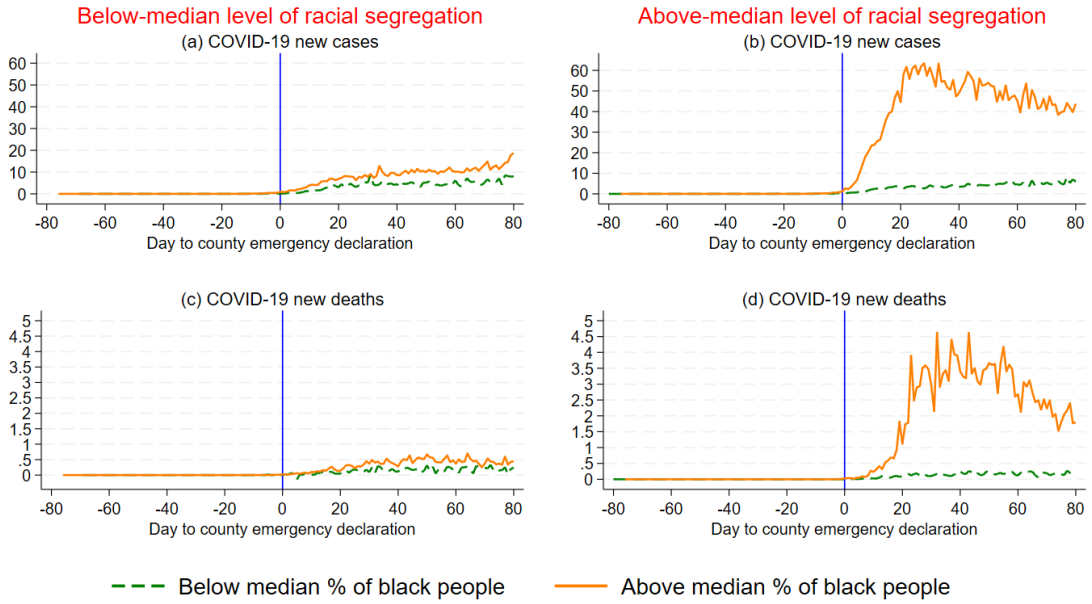
Note: Figure 3 summarizes, for different bin sizes, the event-study coefficients and 95% confidence intervals of the effect of interaction between the county-level State of Emergency declaration and race on COVID-19 outcomes when equation 3 is estimated. The vertical axis shows event-study estimates. The period from January 22, 2020 to until 31 days before the State of Emergency declaration is the reference period. The model includes dummies for each period of 10 days before and after the State of Emergency declaration. 95% confidence intervals around the estimated regression coefficients are plotted. All specifications include county and day fixed effects. Standard errors are clustered at the state level.

Figure 4: Placebo test: Dynamic of the effect of the interaction between fictitious emergency declarations and race on COVID-19 outcomes



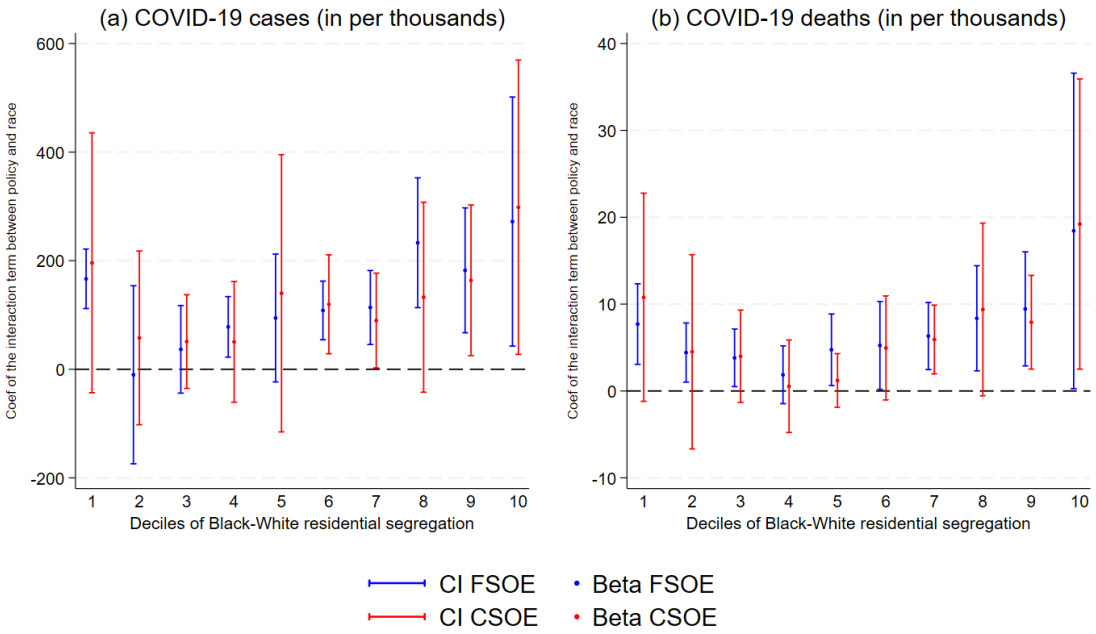
Note: Figure 4 summarizes, for different bin sizes around the fictitious policy dates, the regression coefficients and 95% confidence intervals of the interaction term between a placebo policy 45 days after the Federal State of Emergency Declaration and race when equation 1 is estimated (denoted by FSOE, shown in blue), and the regression coefficients of the interaction term between the a placebo policy 45 days after the county-level State of Emergency Declaration and race when equation 2 is estimated (denoted by CSOE, shown in red). For example, 5 on the x-axis indicates a bin size of five days before and after the placebo policy. Panel (a) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 cases. Panel (b) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 deaths. All specifications include county and day fixed effects. Standard errors are clustered at the state level.

Figure 5: COVID-19 and county-level emergency declaration by race and racial segregation



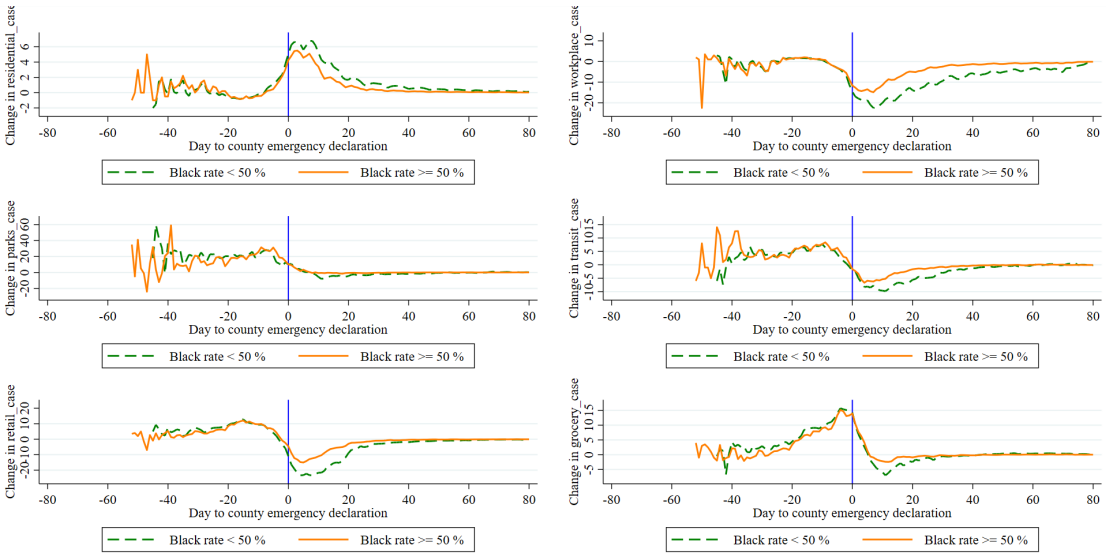
Note: Figure 5 plots the average number of new daily COVID-19 cases and deaths in U.S. counties relative to the date of their county-level State of Emergency declarations (denoted by the blue line), shown in separate graphs for counties with below-median (Panels a and c) and above-median (Panels b and d) levels of Black-White racial residential segregation. The average number of daily cases (Panels a and b) is shown for counties with above-median values of Black rate (shown in orange) and below-median values of Black rate (shown in green). Panels c and d of Figure 3 plot the equivalent statistics for average daily deaths attributed to COVID-19.

Figure 6: Interaction between emergency declarations and race on COVID-19 outcomes by level of racial segregation



Note: Figure 6 summarizes the regression coefficients and 95% confidence intervals of the interaction term between the Federal State of Emergency Declaration and race when equation 1 is estimated (denoted by FSOE, shown in blue), and the regression coefficient of the interaction term between the county-level State of Emergency Declaration and race when equation 2 is estimated (denoted by CSOE, shown in red). Each regression is estimated separately for each decile of White vs non-white residential segregation. Panel (a) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 cases. Panel (b) shows coefficients of equations 1 and 2 when estimated for the outcome of new daily COVID-19 deaths. All specifications include county and day fixed effects. Standard errors are clustered at the state level

Figure 7: Mobility and county-level emergency declaration by level of race



Note: Figure 7 plots the average change in each of six measures of mobility relative to the date of implementation of county-level State of Emergency declarations using data from Google Community Mobility Reports. Changes in mobility are changes relative to the median value of frequency of visit and duration of stay for the same day of the week in a pre-pandemic reference week (January 3, 2020 through February 6, 2020). From left to right, top to botom, mobility data are presented for change in visits to residences, workplaces, parks and outdoor spaces, transit stations, retailers and recreational outlets, and groceries and pharmacies. In each panel of the figure, changes in mobility are shown separately for counties with above-median values of ethnic fragmentation (shown in orange) and below-median values of ethnic fragmentation (shown in green), where ethnic fragmentation is defined for each county as the value of the Herfindahl-Hirschman Index. In this figure, mobility measures are adjusted for the cumulative number of COVID-19 cases.

Table 1: Descriptive Statistics of the Main Variables of Interest

	N	Mean	Std. de.	Min.	Max.
Total cases*	3,143	610.29	3307.51	0	82,427
Total death*	3,143	34.71	247.11	0	6,841
Duration of the pandemic	3,143	67.80	22.34	0	231
Ethnic Fragmentation Index	3,142	0.31	0.18	0	0.83
White vs non-white Residential segregation index	2,791	30.81	13.18	0	90
Black-White Residential segregation index	2,069	45.18	16.42	0	89
County with SOE (in %)	3,143	0.28	0.45	0	1
County with safer-at-home order (in %)	3,143	0.05	0.21	0	1
County with business closure (in %)	3,143	0.01	0.09	0	1
Residential**	1,541	1.15	1.20	-4	8.70
Workplace**	2,740	-6.70	6.91	-67	1.11
Retail**	2,528	-4.15	10.77	-66	47.64
Grocery**	2,438	2.95	6.63	-50	70.05
Transit**	1,133	-1.17	6.41	-51	33.87
Parks**	984	0.96	14.12	-63	193.00
Population density	3,117	431.96	2193.84	0	79761.45
Percentage of male	3,142	50.09	2.38	41	79.00
Median age	3,142	41.29	5.41	22	67.00
Poverty rate	3,141	15.60	6.48	2	55.10
Educational attainment	3,142	0.86	0.06	0	0.99
Urban population (in %)	3,140	0.41	0.32	0	1.00
Foreign-born (in %)	3,142	4.72	5.71	0	53.25
Adults with fair or poor health (in %)	3,142	17.94	4.74	8	40.99
Smokers (in %)	3,142	17.47	3.61	6	41.49
Adults with obesity (in %)	3,142	32.86	5.45	12	57.70
Adults with diabetes (in %)	3,142	12.12	4.06	2	34.10

Note: Table 1 presents descriptive statistics on county-level characteristics and COVID-19 outcomes. Mobility data are not available from Google Community Reports for all counties as Google does not release data for which insufficient observations of mobility exist. Sociodemographic variables are calculated from the 2018 American Community Survey. COVID-19 outcomes are compiled from USAFacts. County-level policy variables are retrieved from the National Association of Counties. *Average of the cumulative number of COVID-19 cases and deaths as of June 07, 2020. **Mobility measures are adjusted for the cumulative number of COVID-19 cases.

Table 2: Emergency declarations, race, and COVID-19 outcomes

	(1)	(2)	(3)	(4)	(5)
Government policy: National Emergency Declaration					
Panel A: Covid-19 cases (per 100,000 individuals)					
Post FSOE	140.08***	74.33***			
	(14.645)	(7.637)			
Above median % of black people	82.90***	0.00	-11.56	-35.92*	
	(14.324)	(0.003)	(11.453)	(19.150)	
Post FSOE × Above median % of black people		131.50***	131.50***	131.09***	131.50***
		(22.720)	(22.723)	(23.054)	(22.723)
Observations	433,596	433,596	433,596	426,696	433,596
Panel B: Covid-19 deaths (per 100,000 individuals)					
Post FSOE	5.69***	2.55***			
	(0.947)	(0.378)			
Above median % of black people	3.95***	0.00	-1.88**	-2.95**	
	(0.949)	(0.000)	(0.742)	(1.115)	
Post FSOE × Above median % of black people		6.27***	6.27***	6.28***	6.27***
		(1.506)	(1.506)	(1.529)	(1.506)
Observations	433,596	433,596	433,596	426,696	433,596
Government policy: County Emergency Declaration					
Panel C: Covid-19 cases (per 100,000 individuals)					
Post CSOE	156.64***	88.14***	-55.05**	-64.52**	-59.91**
	(23.185)	(13.974)	(24.003)	(25.137)	(26.496)
Above median % of black people	74.15***	-0.03	-10.50	-25.88	
	(20.807)	(0.051)	(13.405)	(19.582)	
Post CSOE × Above median % of black people		124.94***	126.09***	125.28***	129.78***
		(35.319)	(34.783)	(35.580)	(36.577)
Observations	119,370	119,370	119,370	118,128	119,370
Panel D: Covid-19 deaths (per 100,000 individuals)					
Post CSOE	6.39***	3.12***	-3.30**	-3.88***	-3.86***
	(1.277)	(0.598)	(1.287)	(1.376)	(1.335)
Above median % of black people	3.54***	0.00	-1.13	-1.95*	
	(1.152)	(0.004)	(0.848)	(0.977)	
Post CSOE × Above median % of black people		5.96***	6.03***	6.01***	6.00***
		(1.949)	(1.962)	(1.984)	(1.980)
Observations	119,370	119,370	119,370	118,128	119,370
State FE			✓	✓	
County FE					✓
Day FE			✓	✓	✓
Controls				✓	

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. *Controls* include county-level demographic characteristics (i.e. population density, percentage of males, average age, poverty, education, urban area, the percentage of immigrants, share of Trump voters) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 3: Other mobility restriction policies, race, and COVID-19 outcomes

	(1)	(2)	(3)	(4)	(5)
Government policy: National Stringency Index					
Panel A: Covid-19 cases (per 100,000 individuals)					
Stringency index	2.16***	1.14***			
	(0.229)	(0.118)			
Above median % of black people	77.67***	-17.02***	-28.08**	-50.95**	
	(13.702)	(2.999)	(12.262)	(20.341)	
Above median % of black people × Stringency index		2.03***	2.03***	2.02***	2.03***
		(0.358)	(0.358)	(0.363)	(0.358)
Observations	424,170	424,170	424,170	417,420	424,170
Panel B: Covid-19 deaths (per 100,000 individuals)					
Stringency index	0.09***	0.04***			
	(0.015)	(0.006)			
Above median % of black people	3.70***	-0.81***	-2.58***	-3.60***	
	(0.901)	(0.198)	(0.873)	(1.237)	
Above median % of black people × Stringency index		0.10***	0.10***	0.10***	0.10***
		(0.024)	(0.024)	(0.024)	(0.024)
Observations	424,170	424,170	424,170	417,420	424,170
Government policy: County Safer-at-Home					
Panel C: Covid-19 cases (per 100,000 individuals)					
Post county safer-at-home order	155.58***	165.21**	12.03	7.80	5.59
	(31.720)	(60.007)	(28.508)	(26.388)	(23.903)
Above median % of black people	-9.06	-1.16	47.93	44.98	
	(30.368)	(0.703)	(30.657)	(37.174)	
Post county safer-at-home order × Above median % of black people		-14.54	-15.82	-15.58	-14.95
		(55.315)	(52.159)	(52.033)	(52.066)
Observations	20,424	20,424	20,424	20,286	20,424
Panel D: Covid-19 deaths (per 100,000 individuals)					
Post county safer-at-home order	5.09***	4.65**	-0.58	-0.53	-0.14
	(1.123)	(1.780)	(0.950)	(1.097)	(1.150)
Above median % of black people	0.38	0.01**	0.55	0.97	
	(0.864)	(0.003)	(0.831)	(0.920)	
Post county safer-at-home order × Above median % of black people		0.68	0.66	0.65	0.60
		(1.587)	(1.575)	(1.573)	(1.599)
Observations	20,424	20,424	20,424	20,286	20,424
Government policy: County Business Closure					
Panel E: Covid-19 cases (per 100,000 individuals)					
Post county business closure	234.07***	114.71***	-130.67***	-134.01***	-131.70***
	(53.703)	(18.809)	(39.618)	(39.420)	(39.222)
Above median % of black people	118.05***	0.62***	172.27***	-99.83*	
	(32.779)	(0.120)	(34.374)	(49.945)	
Post county business closure × Above median % of black people		215.57***	229.78***	228.98***	229.41***
		(59.716)	(60.358)	(60.694)	(60.671)
Observations	3,726	3,726	3,726	3,726	3,726
Panel F: Covid-19 deaths (per 100,000 individuals)					
Post county business closure	10.91**	1.50***	-10.58**	-10.74***	-10.36**
	(4.478)	(0.284)	(3.414)	(3.301)	(3.246)
Above median % of black people	9.27***	0.00	7.51**	-2.72	
	(2.142)	(0.003)	(2.314)	(1.789)	
Post county business closure × Above median % of black people		17.01***	17.78***	17.82***	17.81***
		(3.931)	(4.024)	(4.045)	(4.041)
Observations	3,726	3,726	3,726	3,726	3,726
State FE			✓	✓	
County FE					✓
Day FE			✓	✓	✓
Controls				✓	

Note: Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. *Controls* include county-level demographic characteristics (i.e. population density, percentage of males, average age, poverty, education, urban area, the percentage of immigrants, share of Trump voters) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 4: Emergency declarations, race, and COVID-19 by level of Black-White racial segregation

	Below median res. seg. (1)	Above median res. seg. (2)	Below median res. seg. (3)	Above median res. seg. (4)
Government policy: National Emergency declaration				
Panel A: Covid-19 cases (per 100,000 individuals)				
Post FSOE	182.84***	182.24***		
	(20.393)	(23.292)		
Above median % of black people	42.23***	103.83***		
	(15.422)	(22.283)		
Post FSOE × Above median % of black people			67.00***	164.70***
			(24.470)	(35.359)
Observations	146,280	139,242	146,280	139,242
Panel B: Covid-19 deaths (per 100,000 individuals)				
Post FSOE	6.91***	8.33***		
	(1.346)	(1.528)		
Above median % of black people	2.71***	5.37***		
	(0.988)	(1.414)		
Post FSOE × Above median % of black people			4.30***	8.52***
			(1.569)	(2.244)
Observations	146,280	139,242	146,280	139,242
Government policy: County Emergency declaration				
Panel C: Covid-19 cases (per 100,000 individuals)				
Post CSOE	187.49***	178.16***	19.48	-130.13***
	(39.141)	(29.044)	(31.178)	(44.065)
Above median % of black people	56.30**	84.68***		
	(26.116)	(28.313)		
Post CSOE × Above median % of black people			101.87**	140.85***
			(49.365)	(46.619)
Observations	44,298	47,886	44,298	47,886
Panel D: Covid-19 deaths (per 100,000 individuals)				
Post CSOE	6.92***	8.11***	-0.38	-7.40***
	(2.189)	(1.512)	(1.385)	(2.472)
Above median % of black people	2.10	5.04***		
	(1.584)	(1.387)		
Post CSOE × Above median % of black people			3.64	8.31***
			(2.748)	(2.279)
Observations	44,298	47,886	44,298	47,886
County FE			✓	✓
Day FE			✓	✓

Note: Each column of each panel reports coefficients from a separate regression. "High res. seg." and "Low res. seg." refer to regressions limited to counties with above- and below-median values of Black-White racial residential segregation, respectively. The dependent variable in each regression is denoted by the corresponding panel title. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 5: Other mobility restriction policies, race, and COVID-19 by level of Black-White racial segregation

	Below median res. seg. (1)	Above median res. seg. (2)	Below median res. seg. (3)	Above median res. seg. (4)
Government policy: National Stringency index				
Panel A: Covid-19 cases (per 100,000 individuals)				
Stringency index	2.80***	2.82***		
	(0.317)	(0.368)		
Above median % of black people	38.88**	98.25***		
	(14.475)	(21.431)		
Above median % of black people × Stringency index			1.02**	2.57***
			(0.378)	(0.560)
Observations	143,100	136,215	143,100	136,215
Panel B: Covid-19 deaths (per 100,000 individuals)				
Stringency index	0.11***	0.13***		
	(0.021)	(0.024)		
Above median % of black people	2.53***	5.06***		
	(0.933)	(1.347)		
Above median % of black people × Stringency index			0.07***	0.13***
			(0.024)	(0.035)
Observations	143,100	136,215	143,100	136,215
Government policy: County Safer-at-Home				
Panel C: Covid-19 cases (per 100,000 individuals)				
Post county safer-at-home order	120.47***	168.65***	-18.91	-22.56
	(20.951)	(35.192)	(32.771)	(34.651)
Above median % of black people	20.70	37.45		
	(22.854)	(24.555)		
Post county safer-at-home order × Above median % of black people			35.28	69.81
			(38.442)	(42.429)
Observations	10,764	7,866	10,764	7,866
Panel D: Covid-19 deaths (per 100,000 individuals)				
Post county safer-at-home order	4.43***	5.25***	0.08	-1.86
	(1.106)	(1.285)	(1.905)	(1.327)
Above median % of black people	0.33	2.10**		
	(1.332)	(0.699)		
Post county safer-at-home order × Above median % of black people			0.40	3.86**
			(2.430)	(1.316)
Observations	10,764	7,866	10,764	7,866
Government policy: County Business closure				
Panel E: Covid-19 cases (per 100,000 individuals)				
Post county business closure	283.14	259.17**	97.40	-218.38**
	(53.856)	(74.309)	(25.689)	(83.102)
Above median % of black people		184.69**		
		(59.922)		
Post county business closure × Above median % of black people				345.81**
				(113.345)
Observations	966	1,656	966	1,656
Panel F: Covid-19 deaths (per 100,000 individuals)				
Post county business closure	19.38	11.82**	6.93	-11.10**
	(4.816)	(4.076)	(4.491)	(4.201)
Above median % of black people		9.70**		
		(3.506)		
Post county business closure × Above median % of black people				18.26**
				(6.659)
Observations	966	1,656	966	1,656
State FE				
County FE			✓	✓
Day FE			✓	✓
Controls				

Note: Each column of each panel reports coefficients from a separate regression. "High res. seg." and "Low res. seg." refer to regressions limited to counties with above- and below-median values of Black-White racial residential segregation, respectively. The dependent variable in each regression is denoted by the corresponding panel title. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 6: Federal state of emergency, race, and Google mobility measures

	(1)	(2)	(3)	(4)	(5)
Panel A: Retail					
Post Federal emergency declaration	-15.79***	-19.20***			
	(0.565)	(0.659)			
Above median % of black people	3.44***	-0.49	-1.33***	-2.47***	
	(0.489)	(0.350)	(0.316)	(0.449)	
Post Federal emergency declaration × Above median % of black people		5.88***	4.99***	5.03***	5.50***
		(0.576)	(0.481)	(0.493)	(0.557)
Observations	194,738	194,738	194,738	194,425	194,722
Panel B: Grocery					
Post Federal emergency declaration	-3.67***	-4.37***			
	(0.314)	(0.341)			
Above median % of black people	-0.31	-1.07**	-0.87	-0.32	
	(0.328)	(0.501)	(0.520)	(0.494)	
Post Federal emergency declaration × Above median % of black people		1.15**	1.51***	1.49***	1.61***
		(0.530)	(0.506)	(0.506)	(0.510)
Observations	184,737	184,737	184,737	184,459	184,718
Panel C: Parks					
Post Federal emergency declaration	-19.64***	-21.06***			
	(1.371)	(2.053)			
Above median % of black people	0.79	-0.67	0.83	-1.49	
	(1.174)	(2.726)	(2.122)	(1.932)	
Post Federal emergency declaration × Above median % of black people		1.98	1.46	1.35	1.22
		(2.363)	(2.467)	(2.480)	(2.527)
Observations	65,129	65,129	65,129	65,129	65,066
Panel D: Transit					
Post Federal emergency declaration	-7.81***	-9.32***			
	(0.581)	(1.017)			
Above median % of black people	0.91*	-0.72	-0.31	-0.57	
	(0.518)	(0.681)	(0.809)	(0.787)	
Post Federal emergency declaration × Above median % of black people		2.17***	2.18***	2.19***	2.16**
		(0.803)	(0.810)	(0.808)	(0.825)
Observations	102,118	102,118	102,118	102,118	102,102
Panel E: Workplace					
Post Federal emergency declaration	-8.54***	-11.71***			
	(0.577)	(0.545)			
Above median % of black people	3.79***	-0.50**	-0.91**	-2.88***	
	(0.339)	(0.193)	(0.351)	(0.430)	
Post Federal emergency declaration × Above median % of black people		5.73***	5.65***	5.63***	5.41***
		(0.493)	(0.491)	(0.490)	(0.484)
Observations	261,011	261,011	261,011	260,566	261,000
Panel F: Residential					
Post Federal emergency declaration	1.85***	2.52***			
	(0.135)	(0.151)			
Above median % of black people	-0.69***	0.01	0.01	0.41***	
	(0.120)	(0.077)	(0.083)	(0.096)	
Post Federal emergency declaration × Above median % of black people		-1.01***	-1.03***	-1.05***	-1.02***
		(0.143)	(0.147)	(0.148)	(0.146)
Observations	120,706	120,706	120,706	120,594	120,699
State FE			✓	✓	
County FE					✓
Day FE			✓	✓	✓
Controls				✓	

Note: In this table, mobility measures are adjusted for the cumulative number of COVID-19 cases. Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. *Controls* include county-level demographic characteristics (i.e. population density, percentage of males, average age, poverty, education, urban area, the percentage of immigrants, share of Trump voters) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 7: County state of emergency, race, and Google mobility measures

	(1)	(2)	(3)	(4)	(5)
Panel A: Retail					
Post county emergency	-11.50***	-14.44***	-5.23***	-5.81***	-6.98***
	(0.693)	(0.979)	(0.886)	(0.905)	(0.915)
Above median % of black people	3.12***	0.06	-0.67	-1.98***	
	(0.434)	(0.482)	(0.539)	(0.617)	
Post county emergency × Above median % of black people		4.78***	4.57***	4.73***	5.53***
		(0.896)	(0.815)	(0.826)	(0.881)
Observations	67,239	67,239	67,239	66,928	67,235
Panel B: Grocery					
Post county emergency	-7.10***	-8.47***	-6.55***	-6.38***	-6.82***
	(0.379)	(0.508)	(0.766)	(0.719)	(0.700)
Above median % of black people	0.01	-1.37**	-1.39**	-0.93	
	(0.266)	(0.587)	(0.539)	(0.553)	
Post county emergency × Above median % of black people		2.19***	2.08***	2.13***	2.53***
		(0.604)	(0.594)	(0.601)	(0.666)
Observations	65,056	65,056	65,056	64,779	65,053
Panel C: Parks					
Post county emergency	-19.62***	-21.34***	-9.51**	-9.51**	-9.74**
	(1.603)	(2.633)	(3.618)	(3.699)	(3.780)
Above median % of black people	0.76	-0.98	-0.89	-2.22	
	(1.504)	(3.294)	(2.242)	(2.154)	
Post county emergency × Above median % of black people		2.46	2.53	2.52	2.75
		(2.839)	(2.890)	(2.923)	(2.956)
Observations	34,310	34,310	34,310	34,310	34,295
Panel D: Transit					
Post county emergency	-6.53***	-7.33***	-7.05***	-6.98***	-7.16***
	(0.507)	(1.321)	(1.392)	(1.480)	(1.538)
Above median % of black people	1.27**	0.45	0.62	0.10	
	(0.513)	(1.227)	(1.484)	(1.492)	
Post county emergency × Above median % of black people		1.15	1.42	1.44	1.55
		(1.369)	(1.467)	(1.497)	(1.536)
Observations	42,907	42,907	42,907	42,907	42,899
Panel E: Workplace					
Post county emergency	-5.03***	-8.14***	-2.88***	-3.61***	-3.70***
	(0.780)	(0.905)	(0.768)	(0.717)	(0.736)
Above median % of black people	4.02***	0.31	-0.28	-2.78***	
	(0.489)	(0.318)	(0.428)	(0.404)	
Post county emergency × Above median % of black people		5.27***	5.51***	5.39***	5.15***
		(0.721)	(0.644)	(0.626)	(0.594)
Observations	80,004	80,004	80,004	79,634	80,002
Panel F: Residential					
Post county emergency	0.86***	1.35***	0.14	0.34	0.40
	(0.126)	(0.180)	(0.271)	(0.266)	(0.283)
Above median % of black people	-0.51***	-0.02	-0.18**	0.29***	
	(0.146)	(0.127)	(0.084)	(0.077)	
Post county emergency × Above median % of black people		-0.72***	-0.84***	-0.85***	-0.85***
		(0.169)	(0.158)	(0.155)	(0.157)
Observations	49,424	49,424	49,424	49,312	49,423
State FE			✓	✓	
County FE					✓
Day FE			✓	✓	✓
Controls				✓	

Note: In this table, mobility measures are adjusted for the cumulative number of COVID-19 cases. Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. *Controls* include county-level demographic characteristics (i.e. population density, percentage of males, average age, poverty, education, urban area, the percentage of immigrants, share of Trump voters) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 8: Federal state of emergency, race, and Google mobility measures by level of Black-White racial segregation

	Below median res. seg. (1)	Above median res. seg. (2)	Below median res. seg. (3)	Above median res. seg. (4)
Panel A: Retail				
Post Federal emergency declaration	-13.97***	-13.84***		
	(0.457)	(0.549)		
Above median % of black people	1.13***	1.85***		
	(0.416)	(0.325)		
Post Federal emergency declaration × Above median % of black people			1.65**	3.48***
			(0.693)	(0.507)
Observations	74,860	89,403	74,858	89,399
Panel B: Grocery				
Post Federal emergency declaration	-2.80***	-4.22***		
	(0.502)	(0.256)		
Above median % of black people	0.28	-0.28		
	(0.478)	(0.288)		
Post Federal emergency declaration × Above median % of black people			1.26*	0.74*
			(0.739)	(0.431)
Observations	73,769	85,946	73,766	85,946
Panel C: Parks				
Post Federal emergency declaration	-18.11***	-20.36***		
	(1.726)	(1.368)		
Above median % of black people	-0.38	0.26		
	(1.852)	(1.254)		
Post Federal emergency declaration × Above median % of black people			4.26	0.25
			(3.899)	(2.682)
Observations	23,655	38,904	23,636	38,869
Panel D: Transit				
Post Federal emergency declaration	-8.46***	-6.73***		
	(0.552)	(0.444)		
Above median % of black people	-0.06	0.10		
	(0.600)	(0.419)		
Post Federal emergency declaration × Above median % of black people			1.13	2.87***
			(1.094)	(0.856)
Observations	40,647	52,345	40,641	52,339
Panel E: Workplace				
Post Federal emergency declaration	-6.40***	-6.50***		
	(0.489)	(0.502)		
Above median % of black people	0.94**	1.91***		
	(0.385)	(0.302)		
Post Federal emergency declaration × Above median % of black people			1.92***	3.19***
			(0.626)	(0.465)
Observations	97,974	102,171	97,970	102,171
Panel F: Residential				
Post Federal emergency declaration	1.72***	1.78***		
	(0.145)	(0.141)		
Above median % of black people	-0.29*	-0.73***		
	(0.153)	(0.110)		
Post Federal emergency declaration × Above median % of black people			-0.58**	-1.06***
			(0.216)	(0.145)
Observations	46,486	67,882	46,484	67,880
County FE			✓	✓
Day FE			✓	✓
Controls				

Note: In this table, mobility measures are adjusted for the cumulative number of COVID-19 cases. Each column of each panel reports coefficients from a separate regression. "High res. seg." and "Low res. seg." refer to regressions limited to counties with above- and below-median values of Black-White racial residential segregation, respectively. The dependent variable in each regression is denoted by the corresponding panel title. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 9: County state of emergency, race, and Google mobility measures by level of Black-White racial segregation

	Below median res. seg. (1)	Above median res. seg. (2)	Below median res. seg. (3)	Above median res. seg. (4)
	Panel A: Retail			
Post county emergency	-10.36***	-10.17***	-4.47***	-4.58***
	(0.738)	(0.658)	(1.120)	(1.073)
Above median % of black people	1.47**	1.62***		
	(0.619)	(0.343)		
Post county emergency × Above median % of black people			0.90	4.69***
			(0.973)	(0.895)
Observations	27,693	33,057	27,693	33,054
	Panel B: Grocery			
Post county emergency	-6.46***	-7.10***	-5.57***	-7.09***
	(0.537)	(0.510)	(1.105)	(0.808)
Above median % of black people	0.19	-0.41		
	(0.464)	(0.294)		
Post county emergency × Above median % of black people			1.70**	1.73**
			(0.812)	(0.768)
Observations	27,096	32,240	27,096	32,240
	Panel C: Parks			
Post county emergency	-18.50***	-20.21***	-11.70***	-9.70***
	(1.645)	(1.739)	(3.982)	(3.503)
Above median % of black people	0.87	0.32		
	(1.976)	(1.572)		
Post county emergency × Above median % of black people			4.41	2.00
			(3.723)	(3.270)
Observations	12,794	20,671	12,787	20,663
	Panel D: Transit			
Post county emergency	-7.30***	-5.59***	-5.52***	-6.63***
	(0.451)	(0.560)	(1.619)	(1.898)
Above median % of black people	0.70	0.47		
	(0.507)	(0.537)		
Post county emergency × Above median % of black people			-0.12	2.70*
			(1.704)	(1.503)
Observations	16,704	23,682	16,701	23,678
	Panel E: Workplace			
Post county emergency	-3.04***	-3.67***	-2.03*	-0.99
	(0.774)	(0.544)	(1.077)	(0.953)
Above median % of black people	1.01	2.49***		
	(0.641)	(0.408)		
Post county emergency × Above median % of black people			1.68*	3.05***
			(0.926)	(0.664)
Observations	31,852	35,709	31,852	35,709
	Panel F: Residential			
Post county emergency	0.70***	0.84***	0.43	0.10
	(0.162)	(0.116)	(0.422)	(0.337)
Above median % of black people	-0.17	-0.57***		
	(0.197)	(0.126)		
Post county emergency × Above median % of black people			-0.43	-0.91***
			(0.292)	(0.156)
Observations	20,397	27,636	20,396	27,636
County FE			✓	✓
Day FE			✓	✓
Controls				

Note: Each column of each panel reports coefficients from a separate regression. "High res. seg." and "Low res. seg." refer to regressions limited to counties with above- and below-median values of Black-White racial residential segregation, respectively. The dependent variable in each regression is denoted by the corresponding panel title. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table 10: Mask wearing, race, and Black-White racial segregation

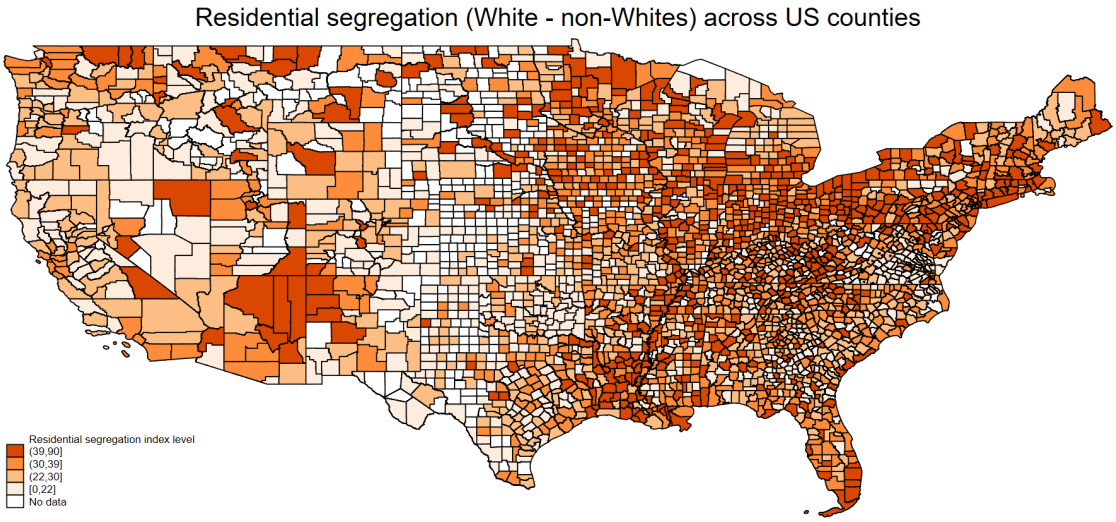
	(1)	(2)	(3)
Panel A: Share of people who say that they frequently wear a mask			
Percentage of Black people	-0.032**		-0.010**
	(0.014)		(0.004)
Black-white seg index (%)		-0.009**	-0.010**
		(0.004)	(0.004)
Observations	2,983	2,063	2,063
Panel B: Share of people who say that they always wear a mask			
Percentage of Black people	-0.075**		-0.023**
	(0.037)		(0.010)
Black-white seg index (%)		-0.024**	-0.027**
		(0.010)	(0.011)
Observations	2,983	2,063	2,063
State FE	✓	✓	✓

Note: In all specifications, the measure of mask wearing is adjusted for the cumulative number of COVID-19 cases reported in June 7, 2020 (the date on which the self-reported mask wearing data was collected). Each column of each panel reports coefficients from a separate regression. The dependent variable in each regression is denoted by the corresponding panel title. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

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Appendix A

Figure A1



Note: The top graphic depicts county-level ethnic fragmentation across the continental United States. As colors progress from white to blue, the level of ethnic fragmentation increases. The bottom graphic shows county-level residential segregation between White and Non-White residents in the United States as measured by a dissimilarity index. As colors progress from pale orange to red, the level of racial residential segregation in the county increases. Both graphs are generated by the authors using data from the 2018 American Community Survey.

Table A1: Cross-correlation table

	(1) Black Rate	(2) White/non-white Segr. index	(3) Black/White Segr. index
Residual - PCA	0.90	0.96	0.95
Residual	0.87	0.92	0.91
Population density	0.14	0.14	0.12
Percentage of male	-0.03	-0.14	-0.05
Average age	-0.26	-0.10	0.02
Poverty	0.23	0.05	-0.20
Education	-0.21	0.09	0.28
Urban area	0.33	0.24	0.28
Immigrants	0.18	0.00	0.07
Poor Health	0.29	0.00	-0.28
Smokers	0.17	0.14	-0.13
Obesity	0.14	0.02	-0.20
Diabetes	0.19	-0.00	-0.23

Note: This table reports the pairwise correlation coefficient between measures of diversity and divisions (denoted in column headings) and several variables. The variable "Residual" refers to the residual from a fitted regression between the measure denoted in the column heading and the risk factors associated with COVID-19 outcomes including county-level characteristics (i.e. population density, percentage of males, average age, poverty, education, urban/rural classification, and the percentage of immigrants) and county-level health characteristics (i.e. the percentage of adults with obesity, in "poor health", with diabetes, and who smoke). The variable "Residual-PCA" refers to the residual from a fitted regression between the measure denoted in the column heading and three principal components factors obtained from a Principal Component Analysis using the set of COVID-19 related risk factors listed above.

Table A2: Effect of the interaction between emergency declarations and race on COVID-19 outcomes by level of Black-White racial segregation

	Cases (1)	Deaths (2)
Government policy: FSOE		
Decile 1: Post FSOE × Above median % of black people	166.57***	7.70***
	(26.616)	(2.251)
Observations	29,808	29,808
Decile 2: Post FSOE × Above median % of black people	-10.10	4.42**
	(79.636)	(1.654)
Observations	28,980	28,980
Decile 3: Post FSOE × Above median % of black people	36.70	3.82**
	(39.162)	(1.608)
Observations	27,738	27,738
Decile 4: Post FSOE × Above median % of black people	78.07***	1.86
	(27.055)	(1.615)
Observations	27,876	27,876
Decile 5: Post FSOE × Above median % of black people	94.36	4.75**
	(57.200)	(1.999)
Observations	31,878	31,878
Decile 6: Post FSOE × Above median % of black people	108.35***	5.24**
	(26.216)	(2.456)
Observations	29,670	29,670
Decile 7: Post FSOE × Above median % of black people	113.72***	6.33***
	(33.063)	(1.875)
Observations	26,634	26,634
Decile 8: Post FSOE × Above median % of black people	233.03***	8.36***
	(58.061)	(2.938)
Observations	28,428	28,428
Decile 9: Post FSOE × Above median % of black people	182.17***	9.45***
	(55.828)	(3.189)
Observations	26,496	26,496
Decile 10: Post FSOE × Above median % of black people	272.04**	18.43**
	(111.370)	(8.818)
Observations	28,014	28,014
County FE	✓	✓
Day FE	✓	✓
Policy and EFI controls		

Note: Each row is from a separate regression. The table shows estimates of the effect of the interaction between emergency declarations and Black rate on COVID-19 outcomes separately for different deciles of Black-White racial residential segregation. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.

Table A3: Social associations in Predominantly Black counties by decile of Black-White racial segregation

	Membership in association (1)
Decile 1: Above median % of black people	0.53
	(1.190)
Observations	210
Decile 2: Above median % of black people	-1.13
	(2.052)
Observations	204
Decile 3: Above median % of black people	1.17
	(0.882)
Observations	191
Decile 4: Above median % of black people	0.25
	(1.015)
Observations	190
Decile 5: Above median % of black people	-1.19**
	(0.565)
Observations	224
Decile 6: Above median % of black people	-0.17
	(0.675)
Observations	208
Decile 7: Above median % of black people	-0.11
	(0.699)
Observations	183
Decile 8: Above median % of black people	-0.67
	(0.460)
Observations	201
Decile 9: Above median % of black people	-0.21
	(0.525)
Observations	181
Decile 10: Above median % of black people	-1.50*
	(0.868)
Observations	195
State FE	✓

Note: Each row is from a separate regression. Social associations rate is measured as the number of membership associations per $10,000$ individuals in a county. The table shows estimates of the effect of Black rate on social associations rate for different deciles of Black-White racial residential segregation. Standard errors are clustered at the state level. ***p < .001, ** p < .01, * p < .05.