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Misinformation During a Pandemic

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We will update estimates on cases and deaths periodically as new data becomes available.

Abstract

We study the effects of news coverage of the novel coronavirus by the two most widely-viewed cable news shows in the United States — *Hannity* and *Tucker Carlson Tonight*, both on Fox News — on viewers’ behavior and downstream health outcomes. Carlson warned viewers about the threat posed by the coronavirus from early February, while Hannity originally dismissed the risks associated with the virus before gradually adjusting his position starting late February. We first validate these differences in content with independent coding of show transcripts. In line with the differences in content, we present novel survey evidence that Hannity’s viewers changed behavior in response to the virus later than other Fox News viewers, while Carlson’s viewers changed behavior earlier. We then turn to the effects on the pandemic itself, examining health outcomes across counties. First, we document that greater viewership of *Hannity* relative to *Tucker Carlson Tonight* is strongly associated with a greater number of COVID-19 cases and deaths in the early stages of the pandemic. The relationship is stable across an expansive set of robustness tests. To better identify the effect of differential viewership of the two shows, we employ a novel instrumental variable strategy exploiting variation in when shows are broadcast in relation to local sunset times. These estimates also show that greater exposure to *Hannity* relative to *Tucker Carlson Tonight* is associated with a greater number of county-level cases and deaths. Furthermore, the results suggest that in mid-March, after Hannity’s shift in tone, the diverging trajectories on COVID-19 cases begin to revert. We provide additional evidence consistent with misinformation being an important mechanism driving the effects in the data. While our findings cannot yet speak to long-term effects, they indicate that provision of misinformation in the early stages of a pandemic can have important consequences for how a disease ultimately affects the population.

JEL Codes: D1, I31, Z13.

Keywords: Media, Health, Coronavirus

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We're not just fighting an epidemic; we're fighting an infodemic.

DR. TEDROS GHEBREYESUS, WHO DIRECTOR-GENERAL, FEBRUARY 15, 2020

1 Introduction

Efforts to contain a pandemic depend crucially on citizens holding accurate beliefs. Yet the spread of the novel coronavirus (COVID-19) in 2020 was accompanied by the spread of news downplaying the extent of the threat and dismissing the importance of measures designed to contain the epidemic. In particular, Fox News, the most-watched cable network in the United States, has faced widespread criticism for spreading misinformation about the pandemic.¹ If true, this could be of particular concern, not only due to Fox's large viewer base but also because its viewers are disproportionately elderly — a population among whom the coronavirus may be up to ten times more fatal than among the general population (Wu et al., 2020). Moreover, given the large externalities inherent in a pandemic, misinformation may have harmful effects far beyond those on viewers themselves by affecting disease transmission trajectories in the broader population.

At the onset of the pandemic, Fox News evening shows differed in the extent to which they portrayed the coronavirus as a serious threat to the United States. This was particularly true for the network's two most popular shows (which are also the two most widely-viewed cable news shows in the United States) — *Hannity* and *Tucker Carlson Tonight*. Before the coronavirus began to spread in January 2020, *Hannity* and *Tucker Carlson Tonight* were relatively similar in content and viewership: both covered the news from a conservative perspective and were broadly supportive of President Trump's policy agenda. Yet as we document using qualitative evidence, text-analysis methods, and human coding of the shows' scripts, the two shows diverged sharply as the coronavirus began to spread beyond China. Carlson warned viewers that the coronavirus might pose a serious threat from early February, while Hannity first ignored the topic on his show and then dismissed the risks associated with the virus, claiming that it was less concerning than the common flu and insisting that Democrats were using it as a political weapon to undermine the president. We also show that Hannity began to moderate his tone in late February and early March, and that the two shows had largely converged in their coverage of the coronavirus by mid-March.

In this paper, we study how differential exposure to these two shows affected behavior and downstream health outcomes. To examine the relationship between viewership of *Hannity* and *Tucker Carlson Tonight* and changes in behavior in response to the coronavirus — e.g. washing hands more often, practicing social distancing, cancelling travel plans, etc. — we fielded a survey to 1,045 Fox News viewers aged 55 or older in early April 2020. In line with the differences in content, we find that Hannity's viewers on average changed their behavior in response to the coronavirus five days later than other Fox News viewers, while Carlson's viewers changed behavior three days earlier than other Fox News viewers. Given the critical importance of early preventative measures (Bootsma and Ferguson, 2007; Markel et al., 2007) this difference in the timing of changes in cautious behaviors may have significant consequences for health outcomes.

¹See, for example, “Fox News has succeeded – in misinforming millions of Americans.” *The Washington Post*, April 1, 2020; “Fox’s Fake News Contagion.” *The New York Times*, March 31, 2020. Relatedly, a group of over seventy journalism professors wrote an open letter highlighting the danger of misinformation spread by Fox News: “Rupert Murdoch, Fox News’ Covid-19 misinformation is a danger to public health,” *The Guardian*, April 9, 2020. Fox News is currently being sued by the Washington League for Transparency and Ethics, which alleges that the network intentionally misled people about the threat posed by the coronavirus and thus facilitated its spread.

We then turn to the effects on the pandemic, examining disease trajectories across counties. We first show that, controlling for a rich set of county-level demographics (including the local market share of Fox News), greater local viewership of *Hannity* relative to *Tucker Carlson Tonight* is associated with a greater number of COVID-19 cases starting in early March and a greater number of deaths resulting from COVID-19 starting in mid-March.² In a set of permutation tests across socio-economic, demographic, political, and health-related covariates, as well as across geographical fixed effects to account for unobservable factors, we show that the established relationship is highly robust. Indeed, the estimated effects of exposure become stronger as we control for more factors.

Even so, areas where people prefer *Hannity* over *Carlson* might differ on a number of unobservable dimensions that could independently affect the spread of the virus. Thus, to identify our effect of interest, we employ an instrumental variable approach that shifts relative viewership of the two shows, yet is plausibly orthogonal to local preferences for the two shows and to any other county-level characteristics that might affect the virus' spread. In particular, we predict this difference in viewership using the product of i) the predicted fraction of TVs on during the start time of *Hannity* (leaving out Fox News) and ii) the local market share of Fox News from 2018, leaving out *Hannity* and *Tucker Carlson Tonight*. To generate cleaner variation in the first term of the interaction, we exploit cross-county variation in local sunset times, which predicts the likelihood that people turn their TV on at different points in the evening. The idea is simple: if people like to turn on their TVs to watch *something* when *Hannity* happens to be on instead of *Tucker Carlson Tonight*, the likelihood that viewers are shifted to watch *Hannity* is disproportionately large in areas where Fox News is popular in general. We show that, conditional on a minimal set of controls, the interaction term is uncorrelated with any among a larger number of variables that might independently affect the local spread of the coronavirus. We then show it strongly predicts viewership in the hypothesized direction. Using this instrument, we confirm the OLS findings that greater exposure to *Hannity* relative to *Tucker Carlson Tonight* leads to a greater number of COVID-19 cases and deaths. Our results indicate that a one standard deviation increase in relative viewership of *Hannity* relative to *Carlson* is associated with approximately 30 percent more COVID-19 cases on March 14, and 21 percent more COVID-19 deaths on March 28. Consistent with the gradual convergence in scripts between the two shows beginning in late February, the effects on cases decline from mid-March onwards. A second instrumental variables approach in the spirit of a shift-share instrument yields qualitatively identical and quantitatively similar conclusions.³

The timing of the estimated effects suggests a potentially important role of the informational content of the two shows in explaining health outcomes. As we document below, we construct a day-by-day index quantifying differential coverage of the pandemic on *Tucker Carlson Tonight* and *Hannity*. We show that the pattern of the effects of differential viewership of the two shows on COVID-19 cases mirrors the pattern of the pandemic coverage gap between the shows with a lag of just under one month. The pattern of the effects on deaths follows with an additional two week lag. The timing of effects is thus inconsistent with

²We use viewership data from Nielsen aggregated at the Designated Market Area (DMA) level. We use the most recent data available for all DMAs, covering the month of January 2020. Our measure of viewership therefore does not capture potential endogenous viewership changes in response to the content in February 2020. It instead captures a pre-existing stock of “regular viewers” in the previous month.

³In our main analysis, we consider the effects of viewership of *Hannity* relative to *Tucker Carlson Tonight*, leaving aside effects potentially stemming from other evening shows on Fox News. Our 2SLS estimates use differential viewership of these two shows as the endogenous variable – implying a strong assumption that the instrument is not shifting viewership of any of the other shows. In Section 6, we generalize our analysis to *all* Fox New evening shows and provide evidence that our instrument shifts exposure to misinformation more generally (on Fox News), and that this has effects on cases and deaths.

alternative potential drivers of the patterns in our data, such as time-invariant unobservables correlated with our instrument and differential effects of exposure to the shows that are unrelated to their reporting about the novel coronavirus. Instead, these findings indicate that the documented effects on health outcomes are driven by the differences in how the two shows covered the pandemic during its onset period.

We shed more light on the role of this mechanism by combining detailed information on local viewership shares of different Fox News shows with a measure of how seriously each show portrayed the threat of the coronavirus on each day, based on independent coding of episode scripts. We show that our instrumental variable for the relative viewership between *Hannity* and *Tucker Carlson Tonight* strongly increases predicted exposure to coverage downplaying the threat of the virus, as measured by our index. We also show that our index strongly predicts the number of cases and deaths throughout March and early April 2020.

It is important to note that our findings do not speak to the overall effect on the total cases and death toll associated with the coronavirus in the U.S. We provide evidence that greater exposure to *Hannity* relative to *Tucker Carlson Tonight* increased cases and deaths throughout March and early April. However, it is possible that these effects will fade — and even possibly flip — over time. For example, greater relative exposure to *Hannity* may have simply shifted the timing of infections that would have eventually occurred when the virus became more widespread. Moreover, we cannot account for spillovers: on the one hand, riskier behavior by individuals in one area expose other people (in the same area and in other areas) to the virus; on the other hand, higher numbers of early deaths in one area might make the pandemic more salient and lead to more cautious behavior by other individuals in the area. Still, our findings suggest that a significant number of people died due to exposure to misinformation.

Our work contributes to a literature on the effects of media and propaganda on political behavior and health outcomes (La Ferrara, 2016; Banerjee et al., 2019a; DellaVigna and La Ferrara, 2015; La Ferrara et al., 2012; Bursztyn et al., 2019; Jensen and Oster, 2009; Chiang and Knight, 2011). Previous work has shown that media exposure can increase hate crimes (Müller and Schwarz, 2018; Bursztyn et al., 2019) and mass killings (Yanagizawa-Drott, 2014); it can also affect health outcomes, such as domestic violence (Card and Dahl, 2011; Banerjee et al., 2019b) and fertility choices (La Ferrara et al., 2012; Kearney and Levine, 2015). More closely related to our paper, prior work has highlighted that Fox news causally affects voting choices (DellaVigna and Kaplan, 2007; Martin and Yurukoglu, 2017) and judicial outcomes (Ash and Poyker, 2019). Our identification strategy also relates to a literature on *inattention* to particular news events: crowd-out of news space from events such as the Olympic Games affects government actions, such as responses to natural disasters (Eisensee and Strömberg, 2007) and bombing enemy countries (Durante and Zhuravskaya, 2018).

We also build upon a growing literature on the impact of identity and political polarization on behavior (Gentzkow, 2016; Iyengar et al., 2019; Campante et al., 2020). Long et al. (2019) show that higher county-level Trump vote shares are associated with lower hurricane evacuation rates after conservative media sources began to challenge the validity of hurricane advisories. Related to our study is contemporaneous work studying the correlation between local political ideology and the response to the coronavirus. Barrios and Hochberg (2020) find that areas with a higher Republican vote share perceived lower risk from the coronavirus, as measured by internet searches, and practiced less social distancing, as measured by cellphone data. Similarly, Allcott et al. (2020) use surveys and cellphone based measures of social distancing to study partisan differences in Americans' response to the coronavirus pandemic. Using the same GPS dataset, Andersen (2020) and Wright et al. (2020) find that more Republican counties and counties that watch greater

amounts of Fox News and counties in which Fox News is available practiced less social distancing. Adolph et al. (2020) show that both governors from states with more Trump supporters and Republican governors were slower to implement social distancing policies such as stay-at-home orders and school and business closures. We provide the first evidence on the causal effects of misinformation on health outcomes during a pandemic — COVID-19 cases and deaths.

We also contribute to a literature on the determinants and economic consequences of pandemics. Christensen et al. (2020) study health care delivery during the ebola crisis. Adda (2016) studies how economic activity affects the spread of viral diseases and assesses the effectiveness of social distancing measures. Correia et al. (2020) show that social distancing measures are causally related to better long-run economic outcomes in the context of the 1918 flu pandemic. More generally, we also relate to the broad literature on perceptions of health risks (Fortson, 2011; Oster et al., 2013; Kerwin, 2018; Fetzer et al., 2020; Dupas et al., 2018). Kerwin (2018) studies how information about HIV prevalence affects health behaviors. Oster et al. (2013) studies the role of expectations in shaping medical testing in the context of Huntington disease.

The remainder of this paper proceeds as follows. In Section 2, we provide a brief overview of media coverage of the coronavirus, with a particular focus on the differences in coverage between *Hannity* and *Tucker Carlson Tonight*. In Section 3, we present our survey results relating viewership of different Fox News shows to behavioral change in response to coronavirus. In Section 4, we describe our primary datasets. In Section 5, we present results on health outcomes, starting from OLS regressions and moving to our instrumental variable approach. In Section 6, we provide evidence on mechanisms by combining information from the scripts of the shows with local viewership shares. Section 7 concludes.

2 Setting

2.1 The coronavirus pandemic in the US

The rapid spread of the novel coronavirus (Zhu et al., 2020; Li et al., 2020) has fundamentally disrupted the modern world. The first confirmed case in the United States was reported on January 21, 2020 (Holshue et al., 2020). A few days later, the World Health Organization declared a global public-health emergency.⁴ Throughout most of February, there remained uncertainty about the extent of the coronavirus outbreak and the threat it posed; on February 25, the CDC warned the US public that the virus was likely to spread rapidly in the United States (Jernigan, 2020). On March 11, the WHO declared the novel coronavirus outbreak a pandemic; two days later, President Donald Trump declared a national emergency (Cucinotta and Vanelli, 2020). By late March, the US had 186,082 cases, the highest number of confirmed COVID-19 cases in the world, and 3,806 coronavirus-related deaths (Dong et al., 2020). As of April 7, 95 percent of the US population were under stay-at-home orders banning them from leaving their places of residence for all but “essential reasons”.⁵

⁴ “Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV).” *World Health Organization*, January 30, 2020.

⁵ “Coronavirus: These US states refuse to issue stay-at-home orders.” *Al Jazeera*, April 15, 2020.

2.2 Media coverage of the novel coronavirus on Fox News

Fox News is the most watched cable network in the United States, with an average of 3.4 million total primetime viewers in the first quarter of 2020, compared to 1.9 million for MSNBC and 1.4 million for CNN (the other two of the “Big Three” US cable news networks).⁶ Moreover, the median age of Fox News viewers is 68, substantially higher than that of CNN and MSNBC viewers (Pew, 2012). Both due to its reach and the fact that over half of its audience is over the age of 65 — a group that the CDC warns is at elevated risk from the coronavirus — Fox News may exert substantial influence on COVID-19 outcomes. This is particularly true given that the elderly both watch more TV in general than the average US citizen and because they disproportionately rely on television for news and information (Martin and Yurukoglu, 2017).

Primetime shows on Fox News There are seven different news shows on Fox News running between 5pm and 11pm across the four major time zones in the continental US: *The Five* (5pm-6pm ET); *Special Report with Bret Baier* (6pm-7pm ET); *The Story with Martha MacCallum* (7pm-8pm ET); *Tucker Carlson Tonight* (8pm-9pm ET); *Hannity* (9pm-10pm ET); *The Ingraham Angle* (10pm-11pm ET); and *Fox News at Night* (11pm-12pm ET). Most of our paper focuses on the two most widely-viewed news shows on Fox News — indeed, in the United States: *Hannity* and *Tucker Carlson Tonight* — with an average of 4.2 million and 4 million daily viewers in the first quarter of 2020, respectively. Before the coronavirus began to spread in January 2020, *Hannity* and *Tucker Carlson Tonight* were relatively similar in content and viewership: both covered the news from a conservative perspective and were broadly supportive of President Trump’s policy agenda. Yet as we document using qualitative evidence, text-analysis methods, and human coding of the shows’ scripts, the two shows differed sharply in coverage of the coronavirus.

Qualitative evidence: Carlson vs. Hannity Several reputable media outlets have criticized Fox News’ coverage of the novel coronavirus, claiming that the network, and in particular Sean Hannity misled viewers about the dangers the virus posed.⁷ Tucker Carlson, however, stood out as an outlier on Fox News for his insistence as early as early February that the coronavirus posed a serious threat to the United States.⁸ Qualitative evidence suggests that *Tucker Carlson Tonight* and *Hannity* differed dramatically in their coverage of the coronavirus, standing out from other Fox shows and particularly from one another. For example, on January 28 — more than a month before the first coronavirus-related death in the US — Tucker Carlson spent a large portion of his show discussing the subject:

All of a sudden the Chinese coronavirus is looking like a real threat, that could be a global epidemic or even a pandemic. It’s impossible to know. But, it’s the kind of thing that could be very serious – very serious.

On February 5, Carlson emphasized the large death toll due to COVID-19 in China and the emergence of COVID-19 cases in the US:

⁶ “Fox News Channel ratings for first quarter of 2020 are the highest in network history.” *Fox News*, March 31, 2020.

⁷ See, for example, “Fox News has succeeded – in misinforming millions of Americans.” *The Washington Post*, April 1, 2020; “Fox’s Fake News Contagion.” *The New York Times*, March 31, 2020. Moreover, a group of over 70 journalism professors have signed an open letter highlighting the danger of misinformation spread by Fox News: “Rupert Murdoch, Fox News’ Covid-19 misinformation is a danger to public health.” *The Guardian*, April 9, 2020.

⁸ See, for example, “His colleagues at Fox News called coronavirus a ‘hoax’ and ‘scam.’ Why Tucker Carlson saw it differently.” *The LA Times*, March 23.

The Chinese coronavirus continues to spread tonight. The death toll now exceeding 500, that's the official number. In the United States, there are now 12 confirmed cases of it. Meanwhile, alarming videos trickling out of China indicate the virus is far from under control.

On February 25, Carlson warned his viewers about the deadly consequences of the coronavirus:

Currently, the coronavirus appears to kill about two percent of the people who have it. So let's be generous for a moment and imagine that asymptomatic carriers are not detected and the real death rate is only say half a percent — that would be one quarter of the current estimates. Even under that scenario, there would still be 27 million deaths from coronavirus globally. In this country, more than a million would die.

In contrast, Hannity covered the coronavirus and its consequences substantially less than Carlson and other Fox shows — particularly in February, when the virus was first beginning to spread in the United States. Even after he began discussing it more prominently in February, he downplayed the threat the virus posed. For example, in his show on February 27, Hannity stated:

And today, thankfully, zero people in the United States of America have died from the coronavirus. Zero. Now, let's put this in perspective. In 2017, 61,000 people in this country died from influenza, the flu. Common flu. Around 100 people die every single day from car wrecks.

In his show on March 2, Hannity strongly emphasized that Democrats were politicizing the virus, claiming that “[Democrats] are now using the natural fear of a virus as a political weapon. And we have all the evidence to prove it, a shameful politicizing, weaponizing of, yes, the coronavirus.” While he began in early March to discuss the mortality statistics in more detail, he continued to emphasize that the virus still posed a relatively minor threat to US citizens. For example, on March 10, Hannity stated:

So far in the United States, there has been around 30 deaths, most of which came from one nursing home in the state of Washington. Healthy people, generally, 99 percent recover very fast, even if they contract it. Twenty six people were shot in Chicago alone over the weekend. You notice there's no widespread hysteria about violence in Chicago.

By mid-March, after President Trump declared a national emergency in response to the coronavirus, Hannity's coverage had converged to that of Carlson and other Fox News shows, emphasizing the seriousness of the situation and broadcasting CDC guidelines:

If you feel sick, stay at home. If your kids feel sick, don't send them to school or day care. If someone in your household has tested positive for coronavirus, please self-quarantine your entire household. Keep them at home. If you are an older person or an individual with underlying medical conditions, a compromised immune system, maybe you are receiving chemotherapy, radiation, have autoimmune issues, whatever the underlying diseases are, please stay away, almost quarantine yourself from other people.

Taken together, the qualitative evidence highlights that (i) Carlson warned his viewers early on about the potential threat posed by the coronavirus; and (ii) Hannity did not cover the coronavirus throughout most

of February, and he downplayed its seriousness until as late as mid-March. To more systematically evaluate differences in the extensive margin of coverage between primetime Fox News shows, we turn to a simple word-counting procedure.

Word counts: Carlson vs. Hannity For each of the seven shows on Fox News airing between 5pm and 11pm local time across the four major time zones, we download episode transcripts from LexisNexis. We count the number of times any of a small list of coronavirus-related terms are mentioned on each day and plot the results in Panel A of Figure 1.⁹ In particular, the *y*-axis of the panel displays the log of one plus the word count on each day.

Compared to the other three primetime shows, both Hannity and Carlson stand out. Both anchors first discussed the coronavirus in late January when the first US case was reported, but Carlson continued to discuss the subject extensively throughout February while Hannity did not again mention it on his show until the end of the month. The other three shows fell somewhere between these two extremes. By early March, the word counts of all shows had converged.

However, this simple procedure does not entirely capture differences in how shows discussed the coronavirus. The qualitative evidence above suggests that while Hannity discussed the coronavirus as frequently as Carlson during early March, he downplayed its seriousness and accused Democrats of using it as a partisan tool to undermine the administration. To capture these differences in the intensive margin of coverage, we turn to human coding of the scripts.

Mechanical Turk script validation Between April 2 and April 6, we recruited workers on Amazon Mechanical Turk to assess how seriously each of the seven shows portrayed the threat of the coronavirus between early February and mid-March. For each episode that contained at least one coronavirus-related term, five MTurk workers read the entire episode script and answered “Yes” or “No” to the following question: “Did [the show] indicate that the virus is likely to infect many people in the US, causing many deaths or serious illnesses, or that many have already become infected and have died or become seriously ill?” We explicitly asked respondents to answer the question based only on the scripts, not their own views on the subject. We impute “No” for each script that does not mention any coronavirus-related terms, and we code “Yes” as 1 and “No” as 0.

Panel B of Figure 1 displays one-week rolling means of this variable for Carlson, Hannity, and the other four shows. Throughout almost the entire period, MTurk workers rate Carlson as portraying the threat of the coronavirus more seriously than the other three shows, and in turn rate the other shows as portraying the threat more seriously than Hannity. In line with the qualitative evidence highlighted above, Hannity converges to Carlson in early to mid-March.

Together, our evidence suggests that coverage of the coronavirus differed enormously between *Tucker Carlson Tonight* and *Hannity*. We next present survey evidence that these differences may have affected viewers’ behavior during the period of initial spread of the coronavirus in the United States.

⁹The words are “coronavirus”, “virus,” “covid,” “influenza”, and “flu”.

3 Survey

In this section, we present correlations between viewership of different primetime Fox news shows and viewers' self-reported timing of behavioral change in response to the coronavirus. On April 3, 2020, we fielded a survey targeting a representative sample of approximately 1500 Republicans aged 55 or older in cooperation with Luc.id, a survey provider widely used in social science research (Wood and Porter, 2019). We focused on this subsample both because such individuals are more likely to watch Fox News and because the elderly are at increased risk from the coronavirus.¹⁰ As we show in Appendix Table A1, our sample is broadly representative of Republicans aged above 55 and older. All survey materials are available in Appendix D.

Survey design After eliciting demographics, we ask respondents which, if any, of the “Big Three” TV news stations (CNN, MSNBC, and Fox News) they watch at least once a week. 1045 individuals reported that they watched any show on Fox News at least once a week; this is the sample we use in our analysis, given our focus on Fox News viewers. We ask respondents to indicate the frequency with which they watch the major primetime shows on each network on a three-point scale (“never”; “occasionally”; “every day or most days”).

We then ask our respondents about any changes in their behavior in response to the coronavirus outbreak. First, we ask whether they have changed any of their behaviors (e.g. cancelling travel plans, practicing social distancing, or washing hands more often) in response to the coronavirus. For those respondents who answer that they have changed behavior, we elicit the date on which they did so.

Results To examine the correlation between viewership of different news shows and the timing of behavioral change, we estimate the following simple specification:

$$\text{TimingChange}_i = \alpha_0 + \beta S_i + \Pi X_i + \varepsilon_i, \quad (1)$$

where TimingChange_i is the number of days after February 1, 2020 on which the respondent reported having significantly changed any of their behaviors in response to the coronavirus, S_i is a vector of indicators for whether the respondent occasionally or regularly watches each of the seven shows, and X_i is a vector of demographic controls.¹¹ The dependent variable for respondents who report that they have not changed any of their behaviors at the time of the survey is recoded to the date on which the survey was administered (April 3). We employ robust standard errors throughout our analysis.

Panel A of Figure 2 plots the smoothed density function of the reported date of behavioral change separately for viewers of Carlson, Hannity, and other Fox News shows. (The majority of viewers watch more than one show and thus appear in multiple panels.) Panel B of Figure 2 plots the coefficient estimates from regressions of the reported date of behavioral change on indicators for whether the respondent watches *Hannity*, *Tucker Carlson Tonight*, and other Fox News shows. As both panels highlight, viewers of *Hannity* changed their behavior substantially later than viewers of other Fox shows (with a relatively large fraction

¹⁰The median age among Fox News viewers is 68.

¹¹The elements of S_i are neither mutually exclusive nor jointly exhaustive; viewers who watch multiple shows will have multiple indicators set to one, while viewers that watch none of the five shows will have none of the indicators set to one.

of respondents changing behavior in late March), while viewers of *Tucker Carlson Tonight* changed their behavior earlier than viewers of other shows.

We display these results in regression table form in Table 1. Column 1 shows that viewers of *Hannity* changed their behavior five days later than viewers of other shows ($p < 0.001$), while viewers of *Tucker Carlson Tonight* changed their behavior three days earlier than viewers of other shows ($p < 0.01$); the difference in coefficients is also highly statistically significant ($p < 0.01$). Column 2 of Table 1 reports a linear probability model in which the dependent variable is an indicator for whether the respondent reported changing behavior before March 1; Carlson viewers were 8.8 percentage points more likely and Hannity viewers 12.8 percentage points less likely to have changed their behavior before March 1 than viewers of other Fox shows. Consistent with the convergence in scripts between shows highlighted in Figure 1, the gap between shows diminishes over time (Columns 3 and 4).

Our survey suggests that show content might affect behavior in response to the coronavirus. However, the correlations could be confounded by omitted variable bias or reverse causality: viewers who did not want to believe that the coronavirus was a serious problem or viewers less inclined to changing their behavior might have selected into watching Hannity. Moreover, our outcome is self-reported behavior, which may bias our estimates if respondents systematically misremember that they changed their behavior earlier or later than they actually did.¹² To address these issues, we turn to hard outcome data on COVID-19 cases and deaths, and later turn to an instrumental variable strategy shifting relative viewership of *Hannity* and *Tucker Carlson Tonight*.

4 Overview of Data Sources

Aside from our survey and the show transcripts we use in our previously-described content validation, we employ six primary categories of data in our observational analysis: (1) show viewership data provided by Nielsen at the day-by-show-by-Designated Market Area (DMA) level; (2) COVID-19 cases and deaths data from the Johns Hopkins Coronavirus Research Center at the county-by-day level; (3) county-level demographics from a variety of sources; (4) county-level data on 2016 Republican vote share from the MIT Election Lab; (5) measures of health system capacity from the American Hospital Association at the individual hospital level; and (6) data on sunset timing from www.timeanddate.com.

Viewership data Our show viewership data is provided by Nielsen. Nielsen reports viewership at the Designated Market Area (DMA) level, of which there are 210 in the US. We focus on the continental United States, excluding the two DMAs in Alaska (Anchorage and Fairbanks) and the single DMA in Hawaii (Honolulu).¹³ Our dataset contains viewership data between 5pm and 11pm (local time) at the DMA-by-timeslot-by-day level. In addition to the number of TVs watching Fox News, we observe the total number of TVs turned on during each timeslot. We supplement this dataset with 2018 data, previously acquired, on the local market share of each of the “Big Three” networks: CNN, MSNBC, and Fox News. To avoid

¹²Reassuringly, the average date on which respondents self-report changing their behavior is around March 10, which has been identified as a crucial point in time when most people started changing their behavior, as measured by mobile phone GPS data (Allcott et al., 2020).

¹³We also exclude Palm Springs, CA; this DMA is so small that it does not contain a county centroid, and thus we are unable to consistently map any counties to Palm Springs.

using variation based on *Hannity* and *Tucker Carlson Tonight*, these market shares are calculated based on evening time slots outside of those two shows.

Ideally, one would like to include Fox News viewership data for all DMAs and all days until the end of our sample period. As of April 2020, data for February and March is not yet available. We use available data for January (available until January 29). This allows us to measure *regular* Fox News viewership patterns at the very beginning of the U.S. coronavirus crisis and *only a few days before* some Fox shows began covering the crisis in more depth, allowing us to predict the information to which they would be exposed in the immediate weeks following the end of our viewership sample. Therefore, as long as viewership is relatively stable across a period of only a few weeks, measurement error will be minor. To assess the extent of potential measurement error, we explore our data across weeks within January and find that viewership remains highly stable. In particular, in Appendix Figure A1, we compare ratings of *Tucker Carlson Tonight* and *Hannity* in early January and late January. On the y -axis, we plot the rating in a given DMA on January 29, 2020, the last day for which we have data; and on the x -axis, we plot the rating in that same DMA on January 8, 2020, three weeks prior.¹⁴ Viewership is highly stable; viewership on January 29 and on January 8 are correlated with $\rho = 0.913$. Moreover, because the coronavirus was not yet a salient news story in January (see Panel B of Figure 1) this approach has the benefit of ruling out the possibility that our results are driven by reverse causality, i.e. residents of counties experiencing more coronavirus-related cases and deaths seeking out news minimizing the seriousness of the crisis.

COVID-19 cases and deaths data We use publicly-available county-level data on *confirmed* COVID-19 cases and deaths from Johns Hopkins University (Dong et al., 2020). The data is a panel at the day-by-county level, with data sourced from a variety of agencies, including the World Health Organization, the Centers for Disease Control, state health departments, and local media reports. Throughout our main analyses, we take the logarithm of one plus the cumulative number of cases and deaths, both to correct for outliers with a large number of cases and because the exponential nature by which a virus spreads makes the logarithm normalization natural. However, our results are qualitatively identical and quantitatively extremely similar if we instead transform cases and deaths by the inverse hyperbolic sine rather than the natural logarithm. Appendix C displays all our main results under the IHS transformation.

Data on COVID-19 cases are potentially subject to both classical and non-classical measurement error. For example, many COVID-19 cases are unreported (Lachmann, 2020), and if differential media coverage of the pandemic influences the rate of case detection, then our coefficient estimates will be biased. To the extent that reverse causality affects our estimates — i.e. viewers of *Hannity* being less concerned about the virus, and thus counties with greater viewership of *Hannity* having lower rates of case detection — it should bias our estimates *downward*. Classical measurement error will not bias our estimates, but will decrease their precision. Nonetheless, we urge caution in interpreting our estimated effects on cases given these potential data limitations. Data on COVID-19 deaths is far less subject to both classical and non-classical measurement error.

¹⁴To maximize comparability, we compare ratings on the same day of the week (Wednesday). While we could in principle compare ratings between Wednesday, January 29 and Wednesday, January 1, we choose January 8 to avoid capturing differences in viewership on New Years' Day.

Demographics We collect demographic data at the county level from a wide variety of sources. Our data on age, racial composition, and household income and educational attainment is drawn from the 2018 round of the American Community Survey. We use data on county rurality from the 2010 Census and data on population drawing from the Annual Estimates of the Resident Population for Counties in the United States provided by the U.S. Census Bureau. Our measures of poverty and health insurance are provided by the US Census Bureau under the 2018 Small Area Income and Poverty Estimates (SAIPE) and 2018 Small Area Health Insurance Estimates (SAHIE) programs. Our data on unemployment is from the US Bureau of Labor Statistics' 2019 Local Area Unemployment Statistics (LAUS). Finally, our data on physical health is from the CDC's Behavioral Risk Factor Surveillance System (BRFSS).

2016 Republican vote share We obtain county-level voting data for the 2016 US Presidential election from the MIT Election Lab, which contains the total number of votes cast and the number of votes cast for each of the major parties.

Health system capacity We construct measures of health system capacity using data from the American Hospital Association's 2018 Annual Survey. The dataset contains detailed information at the hospital level, including the number of beds available in different units and the number of medical personnel employed by the hospital. Although participation in the survey is voluntary, virtually every hospital in the United States submits data. We aggregate data to the county level and select six natural measures of health system capacity: total number of beds, total number of ICU beds, total admissions, total inpatient days, total number of personnel, and total number of nurses.

Sunset timing Our data on sunset timing is drawn from www.timeanddate.com. We extract sunset times for February 1, 2020 for all counties based on their centroids, and we construct the sunset time of each DMA as the population-weighted mean sunset time of all counties in that DMA.

5 Effects on Health Outcomes

In this section, we first discuss the empirical challenge in identifying causal effects. We then present OLS evidence on the effects of differential viewership of the two shows on COVID-19 cases and deaths. Finally, we discuss our instrumental variable approach and present results.

5.1 Empirical Challenge

Obviously, show viewership is not randomly assigned: people self-select into television shows that they like to watch. For example, it is well known that Fox News viewers are over-represented among older individuals and that age is a determinant of COVID-19 mortality. Our object of interest, though, is not to understand the effect of watching Fox News *per se*, but to understand the role of differential information spread by the different shows. Since selection into viewership of *Hannity* and *Tucker Carlson Tonight* is less well known, we begin by examining county-level correlates of their relative popularity. As Appendix Figure A2 displays, counties with a relative preference for *Hannity* differ from counties with a relative preference for *Tucker*

Carlson Tonight on a number of *observable* dimensions, including racial composition, population density, and education. For example, a high share of blacks is positively correlated with popularity of *Hannity*, while a high share of Hispanics is negatively correlated. Rural areas, areas with less education and with less health insurance coverage tend to favor *Hannity* over *Tucker Carlson Tonight*. In contrast, the relative popularity of the two shows is not strongly associated with the share of people over the age of sixty five.

Together, these patterns suggest that a simple OLS estimate would likely be severely biased. The *direction* of the bias, however, is less clear. For example, COVID-19 has severely affected African-American communities, for many reasons beyond *Hannity*'s relative popularity. In this case, we would suspect a positive bias. On the other hand, *Hannity* is less popular in places with less health insurance coverage, which would suggest a negative bias.

In what follows, we will show in a transparent manner how OLS estimates evolve under various combinations of county-level controls and fixed effects. We will then present an instrumental variable approach aimed at solving the identification problem.

5.2 OLS estimates

Specification Our explanatory variable of interest is the DMA-level average difference between viewership of *Hannity* and viewership of *Tucker Carlson Tonight* across all days in January 2020 when both shows are aired. We scale this variable a standard normal distribution for ease of interpretation. We estimate the following specification separately for each day between February 24 and April 13 (for cases) and between March 1 and April 13 (for deaths):

$$Y_{ct} = \alpha_t + \beta_t D_c + \Pi_t X_c + \varepsilon_{ct} \quad (2)$$

where Y_{ct} is an outcome (log one plus cases or log one plus deaths) in county c on day t , D_c is the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*, and X_c is a vector of county-level controls. Since the idea is to look at differential viewership across the two major shows on Fox News, while holding constant the popularity of the network, we always control for the “Big Three” cable TV market shares of Fox News, MSNBC and CNN.¹⁵ To account for the overall popularity of watching Fox News over any other network, or watching TV around the time of *Hannity* and *Tucker Carlson Tonight*, we also include the number of households watching Fox News as a share across all networks, and the average number of TVs turned on to non-Fox channels between 8pm and 11pm Eastern Time (three variables, each capturing one hour). We always include log total population and population density since at a minimum we would expect these to be key determinants of COVID-19 outcomes. To account for unobservable determinants of health outcomes that differ across localities, we will show results using (1) no geographical fixed effects, (2) Census division (nine in total) fixed effects, and (3) state fixed effects. Because our viewership data is at the DMA level and to allow for within-market correlation in the error term, we cluster standard errors at the DMA level, resulting in a total of 206 clusters. Figure 3 displays the values of D_c across the U.S., residualized by the controls described above.

¹⁵We omit CNN since it is collinear with the other two.

Our most extensive OLS specification, which is the preferred one for the reasons outlined above, will include state fixed effects and an extensive set of county-level controls for *race* (the percent white, Hispanic, and black); *education* (the share lacking high school degrees and the share lacking college degrees, for women and men separately); *age* (the percent over the age of sixty-five); *economic* factors (the percent under the federal poverty line, log median household income, the unemployment rate); *health* factors (the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018); *political* factors (Republican vote share and the log total number of votes cast in the 2016 Presidential election) and *geographical* factors (latitude, longitude, the percent in the county living in rural areas, and the log of the distance to Seattle — the initial epicenter of the coronavirus crisis and the site of the first case and death).

Results We report day-by-day results for cases and deaths in Figure 4, including all controls and state fixed effects. The association between relative viewership and both cases and deaths becomes stronger over time until the coefficient on cases peaks in late March and then begins to decline; at the time of writing, the coefficients on deaths are continuing to rise. The lag between the coefficient estimates on cases and the coefficient estimates on deaths is consistent with the approximately two-to-three week lag between infection and death (Wu et al., 2020). Effects on cases are statistically significant at the 5 percent level throughout the majority of the period, while effects on deaths are only statistically significant at the 5 percent level in late March and April. Panel A of Tables 2 and 3 replicate these results in regression table form, reporting OLS results at one-week intervals. Effects on cases start to rise in late February and peak in mid-to-late March before starting to decline, consistent with the convergence in coronavirus coverage between Hannity and Carlson. A one standard deviation greater viewership difference is associated with approximately 2 percent more cases on March 7 ($p < 0.01$), 5 percent more cases on March 14 ($p < 0.01$), and 11 percent more cases on March 21 ($p < 0.01$). The effect size begins to decline, but our 8 percent effect size estimate on April 11 remains statistically significant at the 10 percent level. Deaths follow a similar trajectory on a two-week lag: our estimates imply that a one standard deviation greater viewership difference is associated with 2 percent more deaths on March 21, 5 percent more deaths on March 28, and 8 percent more deaths on April 8, and 10 percent more deaths on April 11.

To probe the robustness of our estimates, we choose a single day for cases — March 14, two weeks into March — and a single day for deaths — March 28, two weeks after our chosen date for cases (given the lag between cases and deaths). We then run our specifications under *every possible combination* of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). Figure 5 reports coefficient estimates and 90 percent and 95 percent confidence intervals for each of these 768 models. The majority of coefficient estimates on cases and deaths are statistically significant at the 5 percent level. All coefficient estimates from specifications including state fixed effects, our most demanding and most precisely estimated specifications, are significant at the 5 percent level. Moreover, our coefficient estimates are relatively stable. Appendix Figure A3 shows a generally positive correlation between the R^2 of each model and the coefficient estimate, providing suggestive evidence that, if anything, omitted variable bias seems to be downward biasing our coefficient of interest. To ensure that our results are not driven by a small number of outliers, we residualize our outcome variables and the standardized difference in viewership by

our controls and fixed effects, then plot the residuals of our outcome variables against the residuals of the viewership difference in Appendix Figure A4. Neither plot gives cause for concern that our estimates are driven by outliers.

A limitation of the OLS approach is that, ultimately, it requires an assumption based on selection-on-observables. We may still be concerned about unobservable factors driving both viewership preferences for *Hannity* over *Tucker Carlson Tonight* and COVID-19 outcomes. To address this concern, we develop a novel instrumental variables strategy to isolate plausibly exogenous variation in relative viewership.

5.3 Instrumental variable approach

To address concerns about unobservables biasing our estimates, we require an instrument that shifts relative viewership of *Hannity* and *Tucker Carlson Tonight*, yet is orthogonal to (i) underlying *preferences* for the shows and (ii) any socioeconomic and demographic factors relevant for the spread of coronavirus or for coronavirus mortality, such as income, racial composition, and health system capacity. In this section, we describe a novel approach to generate plausibly exogenous variation in relative viewership of these two shows exploiting cross-DMA variation in when the sun sets. For now, we will leave aside potential spillover effects onto viewership of other evening shows on Fox News beyond *Hannity* and *Tucker Carlson Tonight*. However, in Section 6, where we investigate mechanisms more in depth, we will allow for arbitrary spillovers and generalize our analysis to *all* Fox News evening shows.

5.3.1 Identification strategy

Construction of instrument We begin by showing important systematic patterns that drive TV viewership over the course of the evening. In particular, DMAs across the country exhibit a relatively consistent inverse-U shaped relationship between the time since sunset and total TV viewership. Panel A of Figure 6 plots a non-parametric local polynomial fitting the relationship between time since sunset and the total number of TVs tuned to non-Fox channels. On average across the country, TV viewership peaks 2.5 hours after sunset and then declines smoothly. Panel A also shows a histogram depicting, at each twelve-minute interval relative to sunset, the number of DMAs in which *Tucker Carlson Tonight* begins in that interval (green) and in which *Hannity* begins in that interval (red). Because both shows are broadcast live — *Tucker Carlson Tonight* at 8pm Eastern Time and *Hannity* at 9pm Eastern Time — both shows are aired much earlier and closer to sunset in more Western time zones (e.g. 5pm and 6pm Pacific Time, respectively). Yet as Panel B of Figure 6 highlights, even holding constant what (clock) time shows air, there remains substantial variation in start time relative to sunset. For example, on February 1, 2020, the sun set at 6:05pm in Louisville, KY — one of the westernmost cities on Eastern Time — whereas it set at 5:15pm in New York, NY, nearly an hour earlier.¹⁶ Finally, to provide intuition at the level of DMAs — the variation used for the construction of the instrument — Figure 7 plots the viewership curve for a random sample of DMAs, alongside associated *Tucker Carlson Tonight* and *Hannity* start times. We can see that DMAs differ in the precise shape of their viewership curve over the course of the evening, but the vast majority exhibit a clear inverted-U pattern.¹⁷

¹⁶Appendix Figure A5 highlights this phenomenon across the continental United States, plotting sunset times in each county on February 1, 2020.

¹⁷Episodes of *Tucker Carlson Tonight* and *Hannity* are generally re-run three hours after they first air, and because our data spans 5pm to 11pm, we observe repeats in more western time zones but not in Eastern Time. In order to avoid making

Our identification strategy exploits cross-DMA variation in sunset timing and viewership preferences alongside timezone-specific variation in local airtimes of *Hannity* and *Tucker Carlson Tonight*, such that cross-DMA variation in the predicted amount of total TV viewership during *Hannity*'s timeslot — or more precisely, total non-Fox TV viewership during this timeslot — generates variation in relative viewership of *Tucker Carlson Tonight* vs. *Hannity*. Let H_{ds} denote viewership of *Hannity* in DMA d and during timeslot s . Let $\widehat{\text{NonFoxHannity}}_{d,s}$ denote the predicted total number of TVs tuned on in DMA d at time s , *leaving out TVs watching Fox News* (i.e. leaving out TVs watching *Hannity*).¹⁸ We predict $\widehat{\text{NonFoxHannity}}_{d,s}$ parametrically for each DMA using a third-order polynomial. Denoting by n_d the sunset time in DMA d , we have:

$$\widehat{\text{NonFoxHannity}}_{d,s} = \alpha_d + \delta_{d1}(s - n_d) + \delta_{d2}(s - n_d)^2 + \delta_{d3}(s - n_d)^3 + \epsilon_{ds}$$

We map the fitted values $\widehat{\text{NonFoxHannity}}_{d,s}$ in Appendix Figure A6.

In constructing our instrument, we also exploit substantial variation in the market share of Fox News, which we map in Appendix Figure A7. The intuition is simple: the difference in viewership between the two shows will be larger when the fraction of TVs turned on during *Hannity*'s time slot is larger, and when the total share of viewers watching Fox News is large. Thus, our identifying variation is based on *interaction* of the predicted fraction of (non-Fox) TV viewership during *Hannity*'s timeslot with the local Fox News share (again computed leaving out *Hannity* and *Tucker Carlson Tonight* to avoid capturing DMA-specific preferences for either anchor). Letting FoxShare_d denote the viewership share of Fox News in DMA d , leaving out *Hannity* and *Tucker Carlson Tonight*, our instrument is given by $\widehat{\text{NonFoxHannity}}_d \times \text{FoxShare}_d$.

Specifications Our first-stage and reduced-form specifications, respectively, are:

$$D_{cd} = \beta_0 + \beta_1 \widehat{\text{NonFoxHannity}}_d \times \text{FoxShare}_d + \beta_2 \widehat{\text{NonFoxHannity}}_d + \beta_3 \text{FoxShare}_d + \Pi_t X_c + \epsilon_{cd},$$

$$Y_{cdt} = \beta_0 + \beta_1 \widehat{\text{NonFoxHannity}}_d \times \text{FoxShare}_d + \beta_2 \widehat{\text{NonFoxHannity}}_d + \beta_3 \text{FoxShare}_d + \Pi_t X_c + \epsilon_{cd},$$

where, in the first-stage, D_{cd} is the standardized difference between the number of viewers of *Hannity* and *Tucker Carlson Tonight* in county c of DMA d , $\widehat{\text{NonFoxHannity}}_d$ is the predicted fraction of TVs turned to non-Fox channels during *Hannity*'s timeslot in DMA d (containing county c) and FoxShare_d is the Fox market share in DMA d (leaving out *Tucker Carlson Tonight* and *Hannity*). As in the OLS, in the reduced form, we run cross-sectional regressions for some outcome Y_{cdt} (cases, deaths) in county c of DMA d on day t . We also always include the same parsimonious set of baseline county-level controls from our OLS specification, X_c , except that to avoid a bad controls problem due to the variation our instrument is meant to capture, we control for the *predicted* share of households with TVs turned on during between 8pm and 10pm ET rather than the actual values. We will also show results using the full set of controls and fixed

assumptions about viewership patterns in western time zones relative to Eastern Time by failing to include Eastern Time viewership that falls outside of the window covered by our data, we simply set viewership to the average viewership across both airings in DMAs in which we observe re-runs.

¹⁸We leave out TVs watching Fox News in order to capture a general DMA preference for TV viewership at a given time rather than specific preferences for Fox News. The logic is analogous to the logic of the leave-one-out estimator used in Bartik instruments (Bartik, 1991).

effects, which also are the same as in the OLS specifications.

The instrument is relevant if $\beta_1 > 0$. The underlying logic is simple: if people like to turn on their TVs to watch *something* when *Hannity* happens to be on instead of or any other Fox show, especially *Tucker Carlson Tonight*, the likelihood that viewers are shifted into watching *Hannity* is disproportionately large in areas where Fox News is popular in general.

Correlation with pre-determined characteristics To illustrate the spatial distribution of the induced variation, Figure 9 maps the residuals of our instrument, where the instrument has been residualized according to the specification above with the baseline controls. In Appendix Figure A8, we report regressions using each county-level covariate as an outcome, scaled to a standard normal distribution to facilitate interpretation, on our instrument. No coefficient is significantly different from zero at the 5 percent level, and coefficient magnitudes are generally small. This lends credibility to the identification strategy. Nevertheless, as in the OLS approach, we will show in a transparent manner the extent to which results are robust to permutations across all possible combinations of the groups of covariates.

Exclusion restriction Our approach is motivated by the fact that (1) *Hannity* and *Tucker Carlson Tonight* are the most-viewed shows in the United States, and by the fact that (2) the differences in coronavirus coverage were greatest between *Hannity* and *Carlson*, with the divergence emerging in early February and lasting for several weeks until eventual convergence by mid-March. In this sense, the instrument is designed to shift differential exposure to misinformation in the early stages of the pandemic through its effects on the two most popular and most relevant shows on Fox News. At a first-order approximation, this seems reasonable. However, as we will discuss more thoroughly in Section 6, even if our instrument is relevant so that $\beta_1 > 0$, it is important to consider potential violations of a narrowly defined exclusion restriction and how such violations influence how we should interpret results. In particular, if one assumes that all of the effects of the instrument on COVID-19 outcomes operate *exclusively* through differential exposure to *Hannity* over *Tucker Carlson Tonight* – the outcome variable in the first-stage regressions – then one would also have to assume that our instrument does not have any spillovers, negative or positive, onto other shows. This is, of course, a strong assumption. For example, it may be that our instrument pushes Fox viewers into regularly watching more *Hannity* and less *Tucker Carlson Tonight*; but that this in turn make them less (or more) interested in watching some other Fox News show. Such spillovers could be very complex, as they would depend on underlying preferences – how shows are complements and substitutes. Patterns of complementarity or substitution between relative viewership of *Hannity* versus *Tucker Carlson Tonight* and viewership of other shows would then violate a narrow exclusion restriction and complicate interpretation of the two-stage least squares regressions.

For these reasons, while we will proceed in this section under the exclusion restriction that the reduced form mainly captures effects from exposure to initially diverging (followed by converging) coverage of the coronavirus by *Hannity* and *Tucker Carlson Tonight*, it is important to keep in mind the aforementioned limitations of the approach. We will provide 2SLS estimates, but we urge caution in interpreting coefficients. We view 2SLS as a convenient way to scale the reduced form in order to assess the magnitudes involved under the narrow exclusion restriction. Most importantly, in Section 6, we will relax the exclusion restriction assumption and employ a more general approach allowing for arbitrary spillovers across Fox News programs,

while still allowing us to investigate the hypothesized mechanism of exposure to differential coverage of the coronavirus crisis.

Instrument relevance As we show graphically in Figure 8, and in regression table form in Appendix Table A2, our instrument strongly predicts viewership of *Hannity* relative to *Tucker Carlson Tonight*. The first-stage F -statistic is never lower than 8, but is generally substantially higher when fixed effects are included. Coefficient estimates are relatively stable: where a one standard deviation higher value of the instrument is associated with approximately a one standard deviation higher viewership of *Hannity* relative to *Tucker Carlson Tonight* ($p < 0.001$), with somewhat tighter confidence intervals when fixed effects are included. For consistency and transparency, we will show reduced form and 2SLS results across all these specifications, as well as permutations across all of the additional combinations.

5.3.2 Results on COVID-19 Cases and Deaths

We next turn to our reduced form and instrumental variable estimates on downstream health outcomes: COVID-19 cases and deaths.

Reduced form effects Our reduced form specification follows our specification for the first stage, but studies the impact of our instrument on deaths and cases, conditional on the same set of controls as in the first-stage equation.

Panel A of Figure 10, which for consistency and ease of comparison mirrors the OLS specification of Figure 4 (that is, the specification with the most extensive set of controls and fixed effects), shows the day-by-day reduced form effects of our instrument on cases and deaths. Effects on cases start to rise in early March and peak in mid-March before gradually declining, consistent with Hannity's changing position on the coronavirus. A one-standard deviation higher value in the instrument is associated with approximately 12 percent more cases on March 7 ($p < 0.01$), 33 percent more cases on March 14 ($p < 0.01$), and 29 percent more cases on March 21 ($p < 0.01$). The effect size gradually declines to a (statistically insignificant) 7 percent on April 11. The initial divergence and eventual convergence of effects on COVID-19 cases are consistent with our proposed mechanism that differential reporting between Hannity and Carlson about the coronavirus from throughout February are driving our results, as we will explore more fully in the next subsection and in Section 5.3.3.

Consistent with medical evidence, effects on deaths start emerging approximately three weeks after cases. The effects on deaths gradually rise from mid-March until the end of the month and then level off. A one-standard deviation higher value in the instrument is associated with 22 percent more deaths on March 28 ($p < 0.01$), 36 percent more deaths on March April 4 ($p < 0.01$), and 31 percent more deaths on April 11 ($p < 0.1$).

Two-stage least squares To quantify effect sizes, we scale the reduced-form estimates by the first stage coefficient using a simple two-stage-least squares procedure. 2SLS allows us to compute confidence intervals on the effects if we are willing to impose the exclusion restriction that all effects operate through relative exposure to *Hannity* relative to *Tucker Carlson Tonight*. However, as mentioned above, it is important to

keep in mind the implicit assumptions that we need to make about consumer preferences and cross-show spillovers.

With this caveat in mind, Panel B of Figure 10 shows the day-by-day 2SLS estimates on cases and deaths. The qualitative pattern follows the pattern from the reduced-form estimates discussed above. A one-standard deviation higher viewership of *Hannity* relative to *Tucker Carlson Tonight* is associated with approximately 11 percent more cases on March 7 ($p < 0.01$), 30 percent more cases on March 14 ($p < 0.001$), and 27 percent more cases on March 21 ($p < 0.01$); the effect then declines to a statistically-insignificant 6 percent more cases on April. As above, a one-standard deviation greater viewership of *Hannity* relative to *Tucker Carlson Tonight* is associated with 21 percent more deaths on March 28 ($p < 0.001$), 33 percent more deaths on April 4 ($p < 0.01$), and 28 percent more deaths on April 11 ($p < 0.10$).

As in Section 5.2, we then run our specifications under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We again focus on March 14 for cases and March 28 for deaths. Figure 11 reports coefficient estimates and 90 percent and 95 percent confidence intervals for each of these 768 models. All coefficient estimates on cases and deaths are statistically significant at the 5 percent level. Once again, we probe robustness to outliers by residualizing our outcome variables and the instrument by our controls and fixed effects, then plotting the residuals of our outcome variables against the residuals of the instrument in Appendix Figure A10. As before, neither plot gives cause for concern that our estimates are driven by outliers.

5.3.3 Mechanism: differential coverage

Taken together, our evidence suggests that higher viewership of *Hannity* relative to *Tucker Carlson Tonight* is associated with a greater number of COVID-19 cases and deaths during the early onset of the coronavirus pandemic. Given the qualitative evidence highlighted in Section 2, the timing of these effects on cases and deaths already suggests an important role of differences in information content between the two shows in driving results. We now examine the timing of deaths and cases relative to the Carlson-Hannity coverage gap more closely by constructing a day-by-day index quantifying the extent to which coverage of the coronavirus on these two shows differed. In particular, we return to our Mechanical Turk coding results from Section 2.2, constructing our index by subtracting the average of the five ratings for each episode of *Tucker Carlson Tonight* from the average of the five ratings for the *Hannity* episode on that same day. Thus, higher values of the index on a given day indicate that the *Tucker Carlson Tonight* episode that aired on that day portrayed the coronavirus as a much more serious threat than the *Hannity* episode on the same day, while lower values of the index indicate that the two episodes were similar in their coverage.

Figure 12 plots this “pandemic coverage gap” over time. The gap peaks in mid-February, a period during which there was no discussion of the coronavirus on *Hannity* and during which *Tucker Carlson Tonight* discussed the topic on virtually every episode, before declining to zero by mid-March. The figure also plots the 2SLS estimates of the effects of the Hannity-Carlson viewership gap on cases and deaths. The trend in coefficient estimates on cases closely mirrors the trend in the Carlson-Hannity pandemic coverage gap with a lag of approximately one month, while the trend in coefficient estimates on deaths follows with an additional two-week lag. These findings suggest that the effects of differential coverage to *Hannity* and

Tucker Carlson Tonight that we document are not driven by longer-term past differential exposure to the shows or unobservable factors correlated both with the spread of the virus and preferences for one show over the other, but rather by differences in how the two shows covered the pandemic during its initial stages of spread.

5.3.4 Alternative instrument

As a robustness check, we present estimates from an alternative instrumental variables approach that follows the same logic as the one based on local sunset times, but that is substantially simpler in its execution. Rather than *predicting* the fraction of TVs tuned to non-Fox channels during Hannity's timeslot based on sunset times, which in principle opens up questions about the appropriate functional form and the uncertainty surrounding its estimation, we simply take the *actual* mean of TVs tuned to non-Fox channels during Hannity's timeslot during the month of January 2020, NonFoxHannity_d . As before, we interact this value with Fox News' viewership share in the DMA (calculated leaving out *Hannity* and *Tucker Carlson Tonight*), FoxShare_d to construct our instrument. This approach therefore closely resembles a standard shift-share instrument (Bartik, 1991), in which the (endogenous) "share" is the Fox viewership share in the DMA and the (exogenous) "shift" is generated by cross-DMA differences in preferences for watching TV during the timeslot when *Hannity* is aired. Like our main instrument, conditional upon the small set of controls accounting for local viewership patterns, this alternative instrument is uncorrelated with our extensive set of county-level demographic characteristics (Figure B2) and measures of health system capacity (Figure B3). In Appendix B, we replicate our analysis with this alternative instrument and find qualitatively identical and quantitatively similar results.

5.4 Assessing magnitudes along the COVID-19 curve

How should one interpret the magnitudes of the coefficients, given that they are estimated at different moments in time as the pandemic spreads? To illustrate, we perform a simple back-of-the-envelope calculation using information on actual COVID-19 case trajectories across counties and combine those with the estimated effects of viewership reported in Figure 10. In particular, by construction, the 2SLS coefficient for any given day will capture the percent increase in cases from a one-standard deviation greater viewership difference between *Hannity* and *Tucker Carlson Tonight*. We use this information by first taking the actual mean cases for each day — effectively capturing the COVID-19 trajectory for a 'representative' county — and adding the implied percent increase as given by the estimated coefficient for that day. We then plot the logarithmic trajectory for actual cases, together with the calculated counterfactual trajectory. We then conduct the same exercise using the data and estimates on COVID-19 deaths.

Panel A of Figure 13 plots the trajectories for cases: (i) log cases for a representative county (in black) and (ii) the implied counterfactual for counties with a one-standard deviation higher viewership of *Hannity* versus *Tucker Carlson Tonight* (in gray). The *relative* magnitude peaks around March 15 at slightly above 0.3 log points, corresponding to approximately a 30 percent increase from the base. However, given the logarithmic scale, the implied magnitude on cases keeps growing in economic importance as the pandemic expands, before slowly converging and turning statistically insignificant. It is noteworthy that by the end of the sample period, the estimated effect has not (yet) turned negative. Put differently, the evidence is

consistent with differential viewership of *Hannity* over *Tucker Carlson Tonight* having induced a steeper curve early on in the pandemic, as opposed to efforts aimed at “flattening the curve”.

Panel B of Figure 13 plots the trajectories for estimated deaths. Similar patterns emerge, except they arise approximately two weeks later. Here, the estimated coefficient of the relative effect peaks in the first week of April, at around 0.4 log points, as Figure 10 also shows clearly. The relative effect remains relatively stable with a slight decline. As the pandemic spreads, however, the slightly declining relative magnitude becomes more economically meaningful as the base grows.¹⁹

6 Generalized Exposure across Fox News Shows

Our estimates in Section 5 focused on the effects of our instrument on differential viewership of *Hannity* and *Tucker Carlson Tonight*. These two shows were the largest outliers on Fox News in their coverage of the coronavirus (in opposite directions), and are the most widely-watched programs on the network and in the United States, suggesting that the viewership gap between the two shows alone had effects on cases and deaths. Yet as we discuss in Section 5.3.1, differences in viewership across those two Fox News shows may, through various spillovers, also correlate with many other shows. Specifically, for any given DMA, regular viewership of *Tucker Carlson Tonight* (airing 8pm-9pm ET) and *Hannity* (airing 9pm-10pm ET) could lead to positive or negative selection into various combinations of: *The Five* (5pm-6pm ET); *Special Report with Bret Baier* (6pm-7pm ET); *The Story with Martha MacCallum* (7pm-8pm ET); *The Ingraham Angle* (10pm-11pm ET); and *Fox News at Night* (11pm-12pm ET).²⁰ Despite the fact that the other evening shows are neither as widely watched as *Hannity* and *Tucker Carlson Tonight*, nor as extreme in their coverage, their content may also have influenced COVID-19 outcomes. In this case, the narrow exclusion restriction, which assumes that effects operate through regular viewership of *Hannity* or *Tucker Carlson Tonight*, would be violated. The fundamental research question of this paper concerns the role of misinformation, and so we now turn to a more general approach to capture viewers’ (predicted) exposure to misinformation on Fox News.

Specifically, for each DMA, we first calculate a measure of predicted local exposure to information about the pandemic across *all* evening-time shows on Fox News. This measure allows us to consider the broad information set to which regular Fox News viewers as of January 2020 – at the very beginning of the U.S. coronavirus crisis and *only a few days before* some Fox shows started ramping up their coverage of the crisis – would be exposed in the following weeks. In other words, since we are using data from January to capture regular viewership patterns, this exercise amounts to predicting local exposure to a *generalized pandemic coverage index* across all Fox evening shows in February.²¹

¹⁹In Appendix Figure A11, we present results from an equivalent exercise using the OLS estimates. The magnitudes of the estimated effects are in general smaller, but remain significant for a longer period.

²⁰Obviously, there could also be spillovers to day-time Fox News shows, but such selection would arguably be less significant given that TV is primarily viewed between 5pm and 11pm. Cross-network spillovers are also possible, into MSNBC for example; capturing such spillovers is beyond the scope of this paper. Such spillovers are likely minor given that viewers tend to favor shows within the same network. Indeed, in the survey discussed in Section 3, 73 percent of respondents report that Fox News is the only cable TV network they watch at least once a week.

²¹From an identification perspective, one advantage of using viewership data immediately before shows started diverging in their coverage of the coronavirus is that any reverse causality, from endogenous selection into shows based on such coverage, can arguably be ruled out. One could, in principle, use February viewership data and solve this problem using an instrumental variable strategy. At the time of writing, however, Nielsen has not yet released February viewership data across all the DMAs

We combine our data on viewership shares of the different shows at the DMA level with our Mechanical Turk episode coding results to construct a measure of information exposure, the *pandemic coverage index*, as the average of the degree to which each show portrayed the coronavirus as a serious threat to the United States, weighted by viewership shares of the show in each DMA. More formally, we define r_{st} to be the average rating of show s on day t and m_{sd} to be the average viewership share of show s in DMA d . Then the *daily exposure* e_{dt} of a DMA is given by:

$$e_{dt} := \sum_{s \in S_d} r_{st} m_{sd}.$$

where S_d is the menu of shows between 5pm and 11pm in DMA d . We rescale e_{dt} in terms of percentage deviations from the mean value of e_{dt} across all DMAs on day t , \bar{e}_t , denoting the rescaled variable \tilde{e}_{dt} :

$$\tilde{e}_{dt} := \frac{e_{dt} - \bar{e}_t}{\bar{e}_t}.$$

We then construct the pandemic coverage index for DMA d as the mean of \tilde{e}_{dt} throughout the month of February:

$$PCI_d := \frac{1}{|\text{Feb}|} \sum_{t \in \text{Feb}} \tilde{e}_{dt} = \frac{1}{29} \sum_{t \in \text{Feb}} \tilde{e}_{dt}.$$

The index therefore captures an (inverse) local “stock” of exposure to news on Fox News underplaying the pandemic threat throughout February relative to the mean exposure across DMAs in the same period. For ease of interpretation, we scale the index to a standard normal distribution. Because we are broadly interested in the effects of misinformation, and to be consistent with our previous figures, we use the inverse of our pandemic coverage index, $-1 \times PCI_d$ throughout the rest of this section.

Columns 1 and 2 of Table 4 highlight that our measure of viewership of *Hannity* relative to *Tucker Carlson Tonight* strongly predicts the pandemic coverage index ($p < 0.001$), whether we include only the minimum set of controls to capture local viewership patterns or we condition on the full set of controls employed in Section 5.2. Next, we examine the extent to which our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$, is associated with the pandemic coverage index. Columns 3 and 4 of Table 4 show that our instrument is strongly and significantly associated with the pandemic coverage index, again whether we include only the minimum set of controls or we condition on the full set of county characteristics. Finally, in Columns 5 and 6 of Table 4, we examine the relationship between the pandemic coverage index and COVID-19 cases and deaths through 2SLS. We follow the approach from Section 5.3, but we use the pandemic coverage gap as the endogenous variable instead of the standardized difference in viewership of *Hannity* versus *Tucker Carlson Tonight*, allowing us to fully capture spillovers between shows on Fox News. Our results suggest that a one percentage point increase in the inverse of the pandemic coverage index increases the number of cases by 3,96 percent on March 14 ($p < 0.001$) and the number of deaths by 2,83 percent by March 28 ($p < 0.001$).

In Figure 14, we estimate the same 2SLS specifications separately for each day, allowing us to examine the relationship between the inverse pandemic coverage index and health outcomes over time. The effect of the inverse pandemic coverage index on cases peaks in mid-March and then begins to decline, while effects in our sample.

on deaths appear to level off in early April and may, at the time of writing, be beginning to decline (though the wide confidence intervals suggest caution in interpretation).

7 Conclusion

Examining the effects of misinformation is particularly important during a pandemic given the large externalities involved and the significant consequences of misinformed behavior for individuals' health and for the health care system as a whole. The two most widely-viewed cable news shows in the United States — *Hannity* and *Tucker Carlson Tonight*, both on Fox News – originally took very different stances on the risks associated with the novel coronavirus. While *Hannity* downplayed the threat during the initial period of the virus' spread in the United States, *Tucker Carlson Tonight* warned its viewers that the virus posed a serious threat from early February. In this paper, we show that differential exposure to these two shows affected behavior and downstream health outcomes.

We begin by validating differences in content with independent coding of shows' transcripts. Consistent with the differences in content, we present new survey evidence that *Hannity*'s viewers changed behavior in response to the virus later than other Fox News viewers, while *Carlson*'s viewers changed behavior earlier. Using both OLS regressions with a rich set of controls and an instrumental variable strategy exploiting variation in the timing of TV consumption, we then document that greater exposure to *Hannity* relative to *Tucker Carlson Tonight* increased the number of total cases and deaths in the initial stages of the coronavirus pandemic. Moreover, the effects on cases start declining in mid-March, consistent with the convergence in coronavirus coverage between the two shows. Finally, we also provide additional suggestive evidence that misinformation is an important mechanism driving the effects in the data.

It is important to note that our results do not speak to the longer-term effects of exposure to the two shows, which might include additional health and information spillovers. Still, our findings indicate that provision of misinformation in the early stages of a pandemic can have important consequences for health outcomes.

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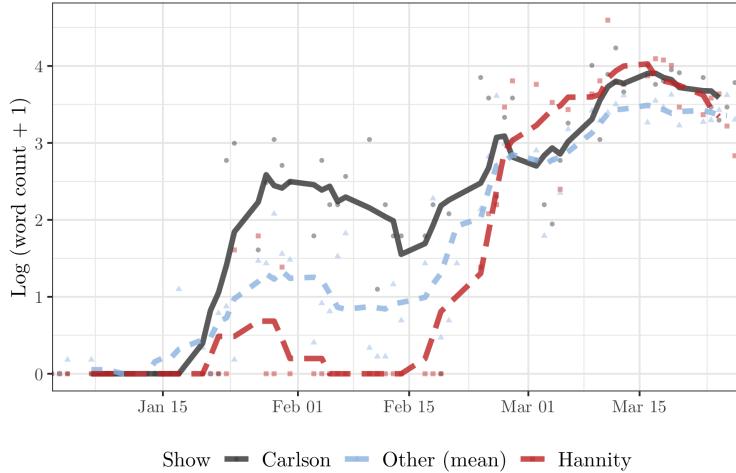
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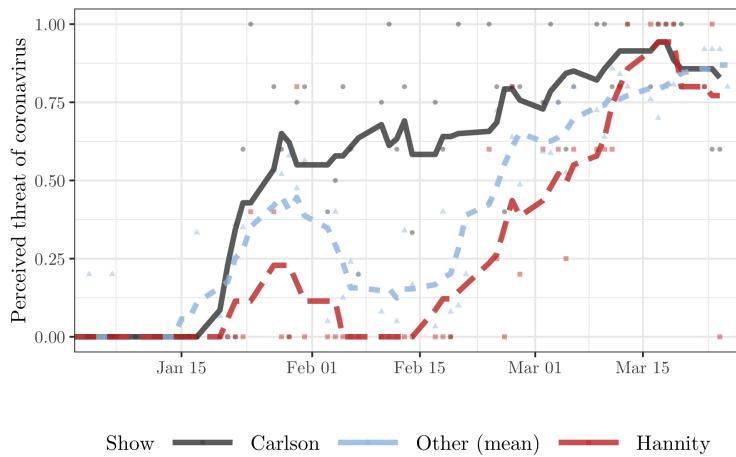
Figures

Figure 1: Show content validation

Panel A: Counts of coronavirus-related terms by episode (one-week rolling means)

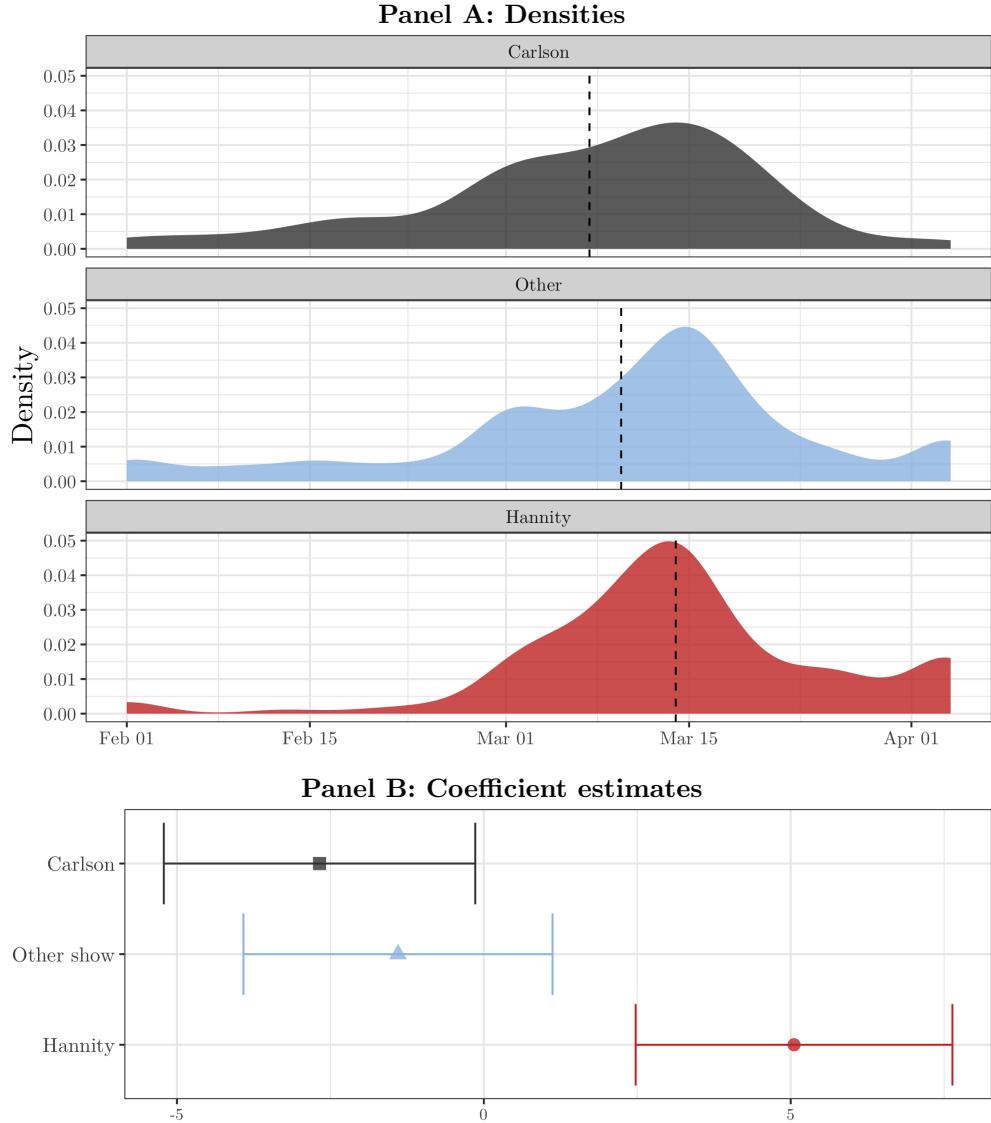


Panel B: MTurk seriousness rating by episode (one-week rolling means)



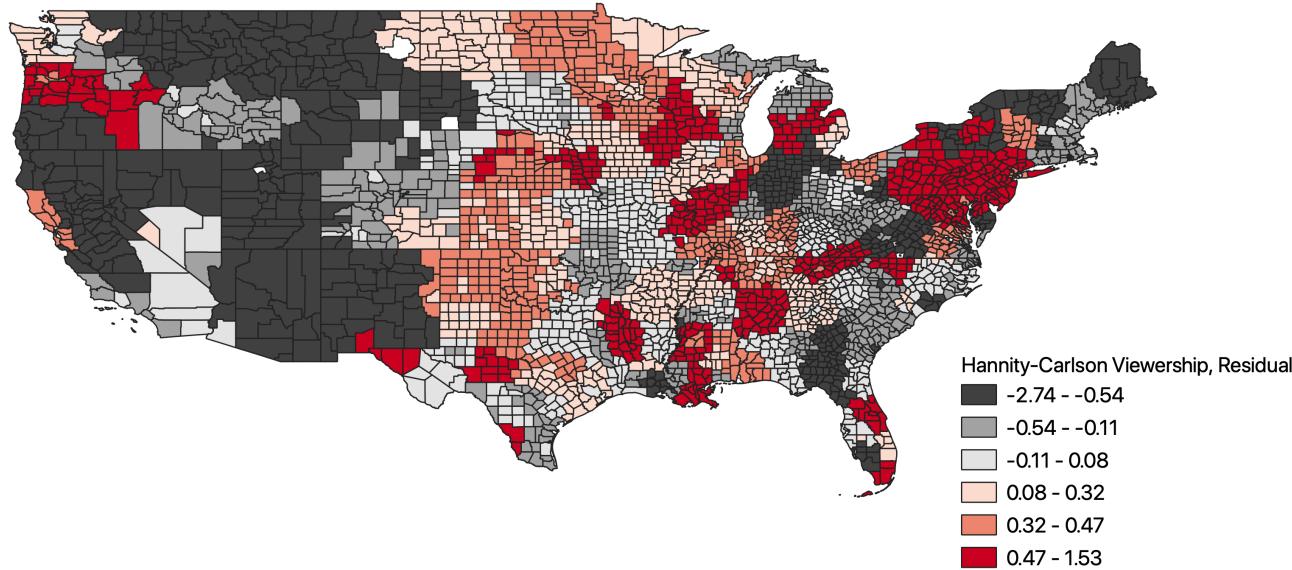
Notes: Panel A shows counts of coronavirus-related terms (coronavirus, COVID, virus, influenza, and flu) separately for *Hannity*, *Tucker Carlson Tonight*, and the other Fox News shows aired on Fox News between 5pm and 11pm local time across all four major time zones in the continental US (*The Five*, *Special Report with Bret Baier*, *The Story with Martha MacCallum*, *Fox News at Night*, and *The Ingraham Angle*). Panel B shows the seriousness rating for each episode, constructed as an average of Amazon Mechanical Turk ratings. For each show containing at least one coronavirus-related term, five MTurk workers read the entire script and answered “Yes” or “No” to the following question: “Did [the show] indicate that the virus is likely to infect many people in the US, causing many deaths or serious illnesses, or that many have already become infected and have died or become seriously ill?” We impute “No” for each episode that does not mention any coronavirus-related terms and recode “Yes” to 1 and “No” to 0.

Figure 2: Timing of behavioral change by show viewership



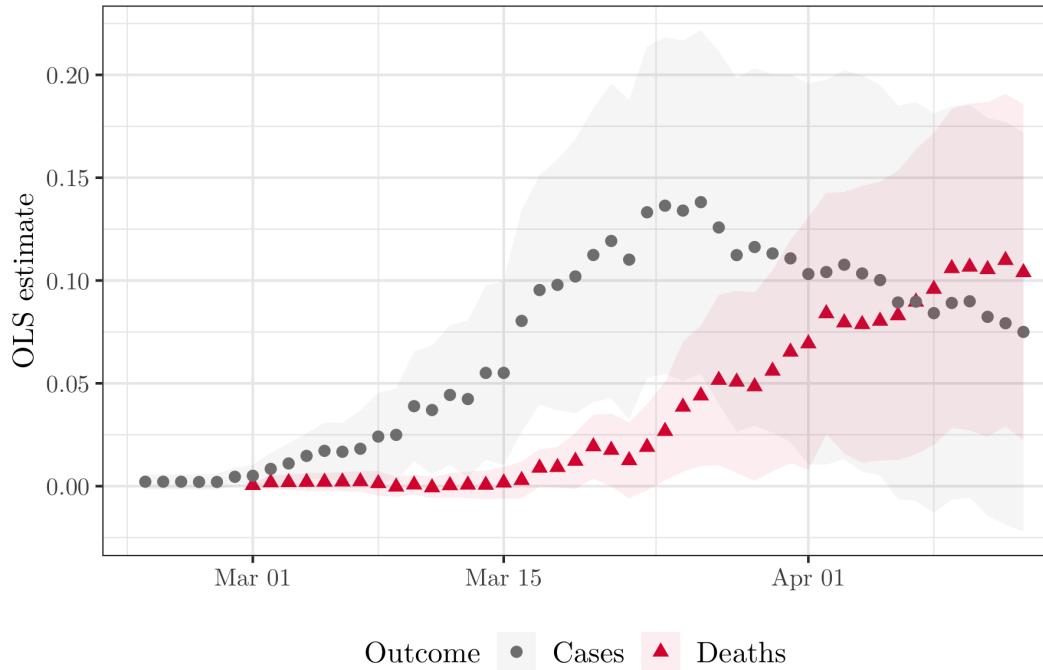
Notes: Panel A of Figure 2 displays the density function of respondents' reported day of behavior change in response to the coronavirus, from our survey of 1045 Republican Fox News viewers over the age of 55. Respondents were asked to indicate the date on which they changed any of their behaviors (e.g. cancelling travel plans, practicing social distancing, or washing hands more often) in response to the coronavirus. The upper panel (in black) shows the density function for viewers of *Tucker Carlson Tonight*; the lower panel (in red) shows the density function for viewers of *Hannity*; and the middle panel (in blue) shows the average density function for viewers of any of the other shows on Fox News between 5pm and 11pm local time across all four major time zones in the continental US: *The Five*, *Special Report with Bret Baier*, *The Story with Martha MacCallum*, *Fox News at Night*, and *The Ingraham Angle*. For respondents who report that they have not changed any of their behaviors by the date of the survey, we impute the date of the survey (April 3). The dashed line indicates the mean date of behavior change among viewers of each show. Panel B reports coefficient estimates from a regression of each respondent's reported date of behavioral change on indicators for whether the respondent watches *Tucker Carlson Tonight*, *Hannity*, or another Fox News show. These categories are not mutually exclusive — a significant number of viewers watch more than one Fox News show — and thus there is no omitted category.

Figure 3: Residualized Hannity-Carlson viewership difference



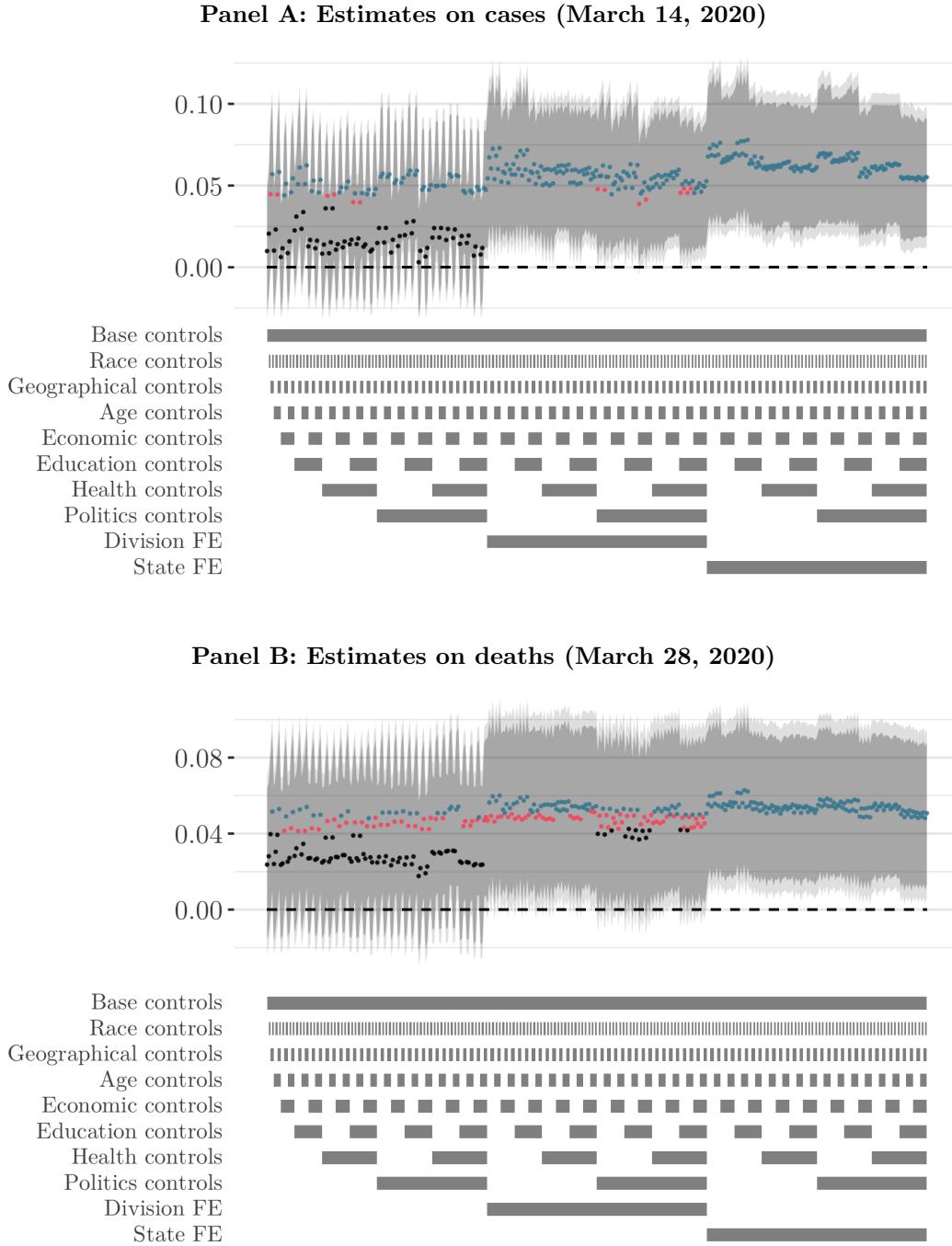
Notes: Figure 3 plots the difference in the viewership of *Hannity* and *Tucker Carlson Tonight* for each of the 207 DMAs in the continental United States, residualized by our base set of controls: the November 2018 and January 2020 market share of Fox News, the November 2018 market share of MSNBC, log total population, population density, the number of TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*.

Figure 4: OLS estimates of effect of differential viewership on cases and deaths



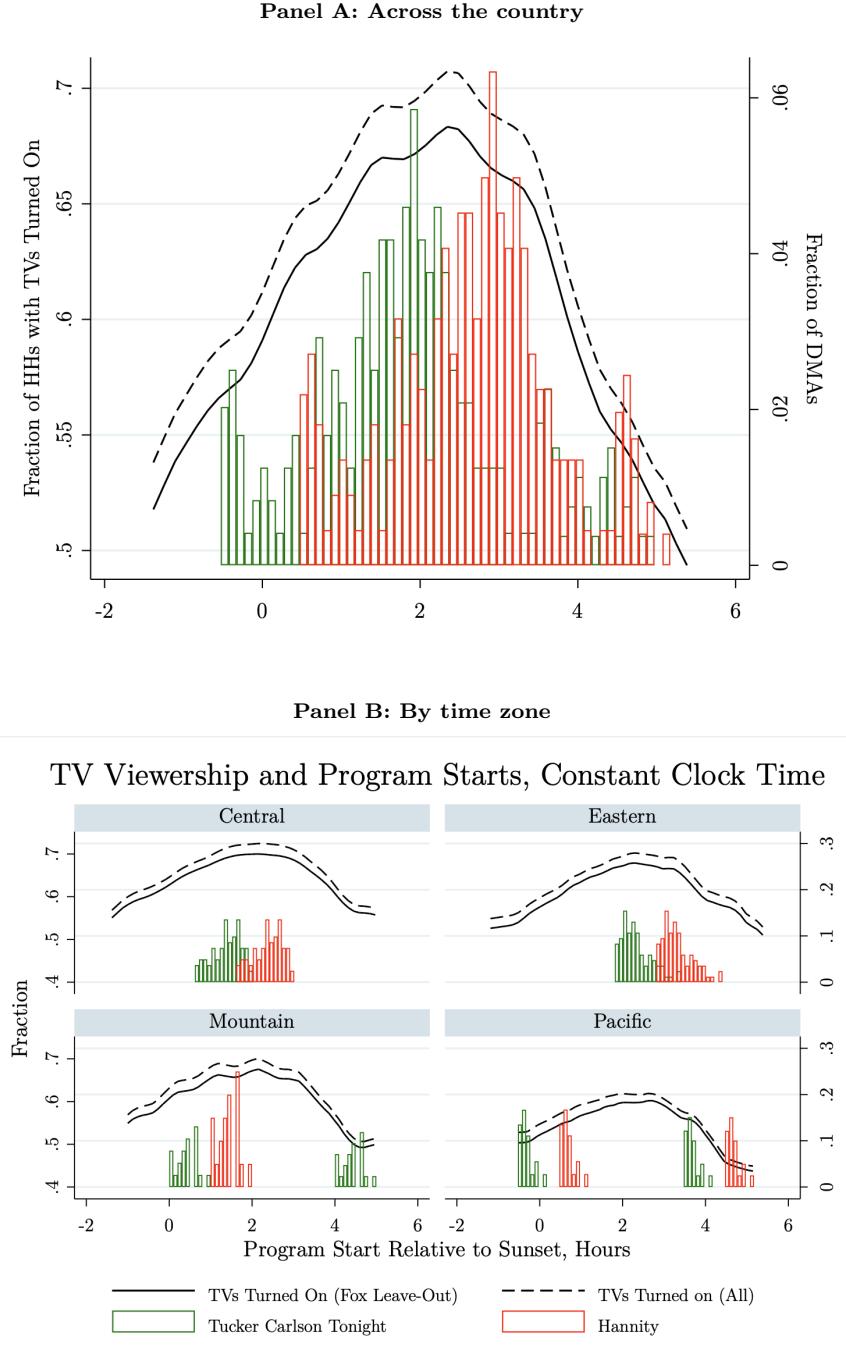
Notes: Figure 4 displays effects of differential viewership of *Hannity* and *Tucker Carlson Tonight* on log one plus cases and log one plus deaths. We report day-by-day results for the correlation between log deaths and log cases with the standardized viewership difference between *Hannity* and *Tucker Carlson Tonight*. All regressions are conditional on state fixed effects and a large set of controls: the November 2018 and January 2020 market share of Fox News, the November 2018 market share of MSNBC, log total population, population density, the number of TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. We cluster standard errors at the DMA level and report 95 percent confidence intervals.

Figure 5: OLS: robustness to combinations of controls



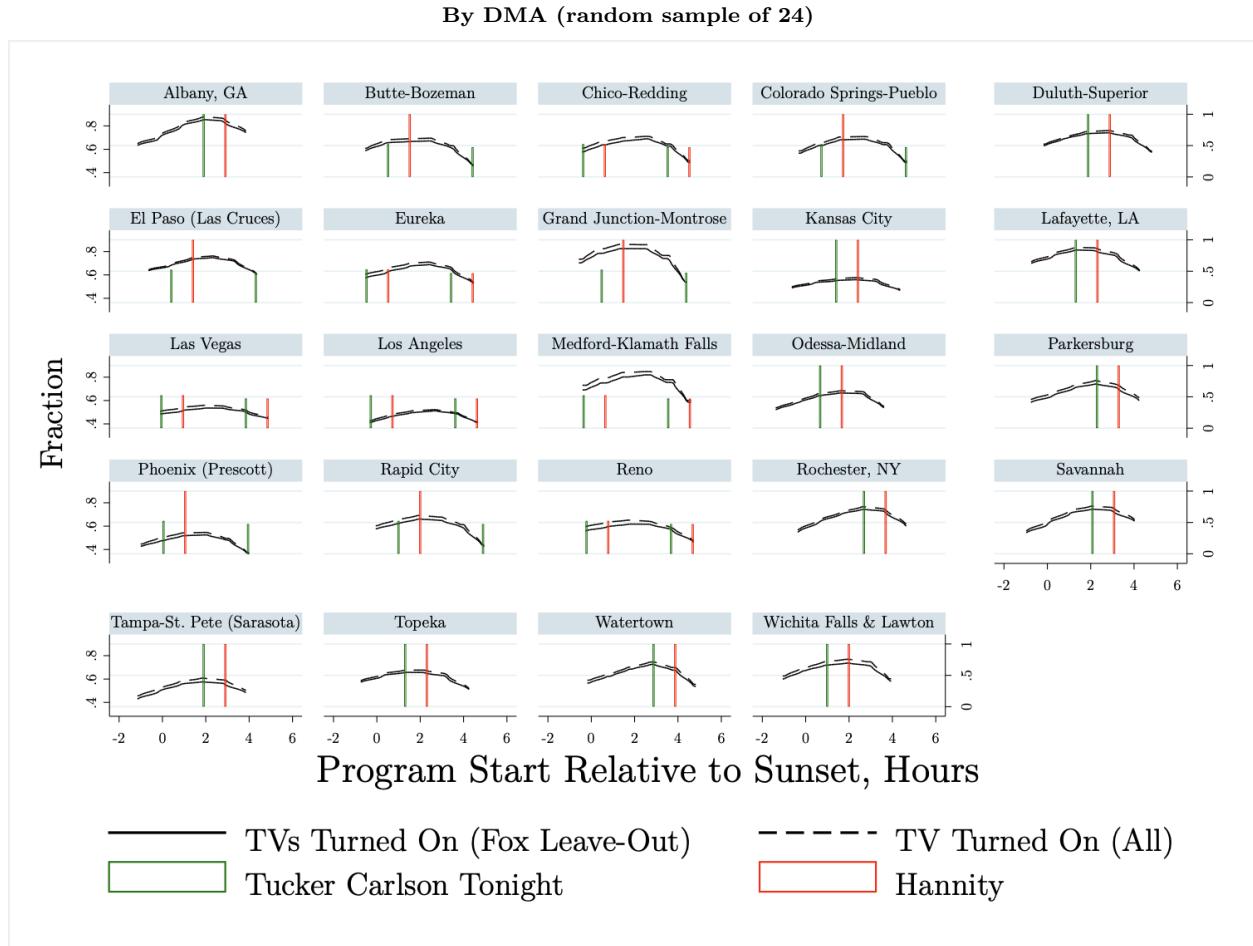
Notes: Figure 5 shows robustness of our OLS estimates for the specifications for log one plus cases on March 14 (Panel A) and log one plus deaths on March 28 (Panel B) under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level and report 90 percent and 95 percent confidence intervals for each model. Blue points are significant at the 5 percent level; red points are significant at the 10 percent level; black points are not significant at the 10 percent level.

Figure 6: Viewership and program start relative to sunset



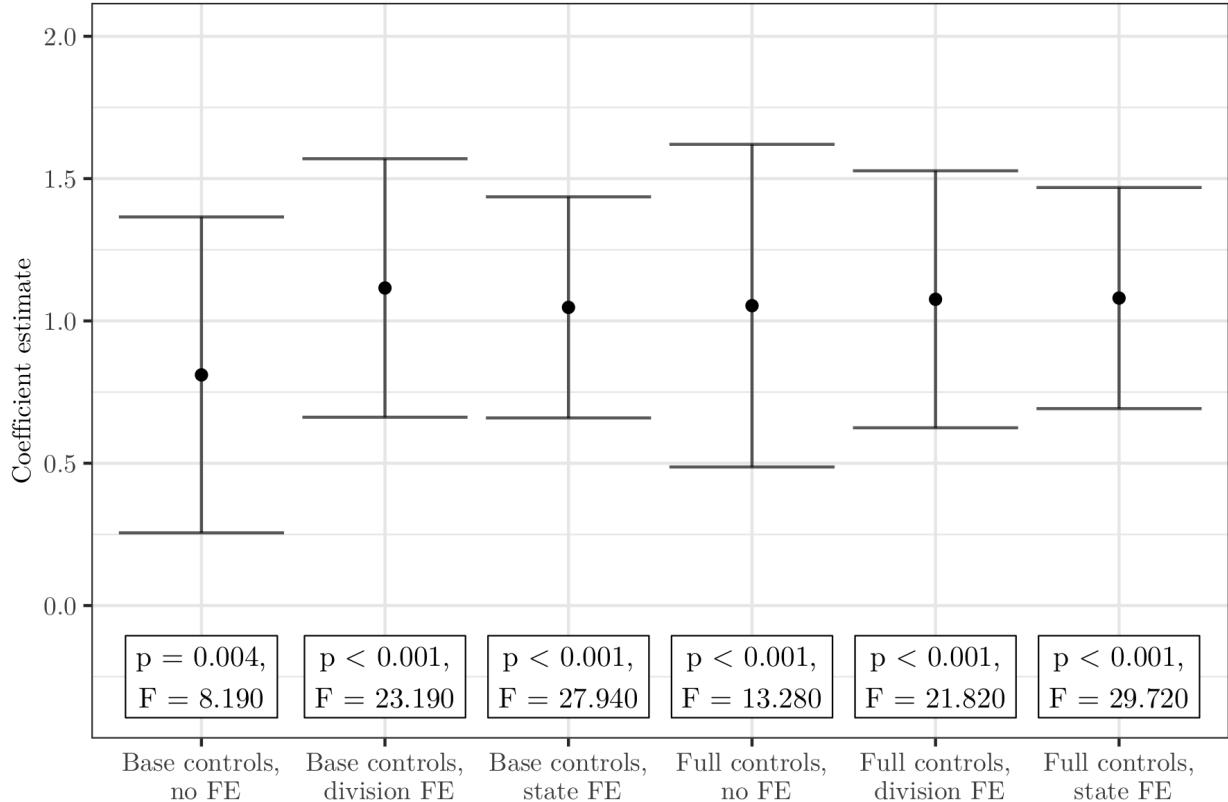
Notes: Panel A of Figure 6 plots a non-parametric local polynomial fitting the relationship between time since sunset in a DMA and the fraction of households in that DMA with TVs turned on (solid line) and the relationship between time since sunset and the fraction of households with TVs turned on and tuned to non-Fox channels (dashed line). Panel A also shows a histogram depicting, at each twelve-minute interval relative to sunset, the number of DMAs in which *Tucker Carlson Tonight* begins in that interval (green) and in which *Hannity* begins in that interval (red). Episodes of *Tucker Carlson Tonight* and *Hannity* are generally re-run three hours after they first air, and because our data spans 5pm to 11pm, we observe repeats in more western time zones but not in Eastern Time. Panel B is similar, but plots the relationship and histogram separately for each of the four major time zones in the continental United States.

Figure 7: Viewership and program start relative to sunset for 24 DMA



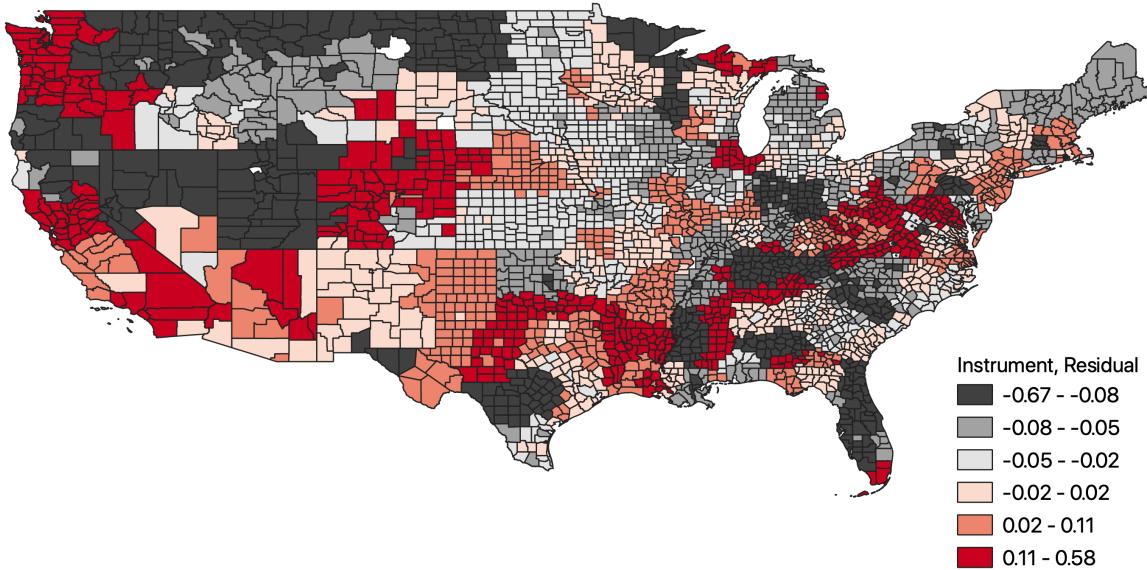
Notes: Figure 7 plots a non-parametric local polynomial fitting the relationship between time since sunset in a DMA and the fraction of households in that DMA with TVs turned on (dashed line) and the relationship between time since sunset and the fraction of households with TVs turned on and tuned to non-Fox channels (solid line). The figure plots the relationship separately for six randomly-selected DMAs within each time zone.

Figure 8: Instrument first stage on relative viewership



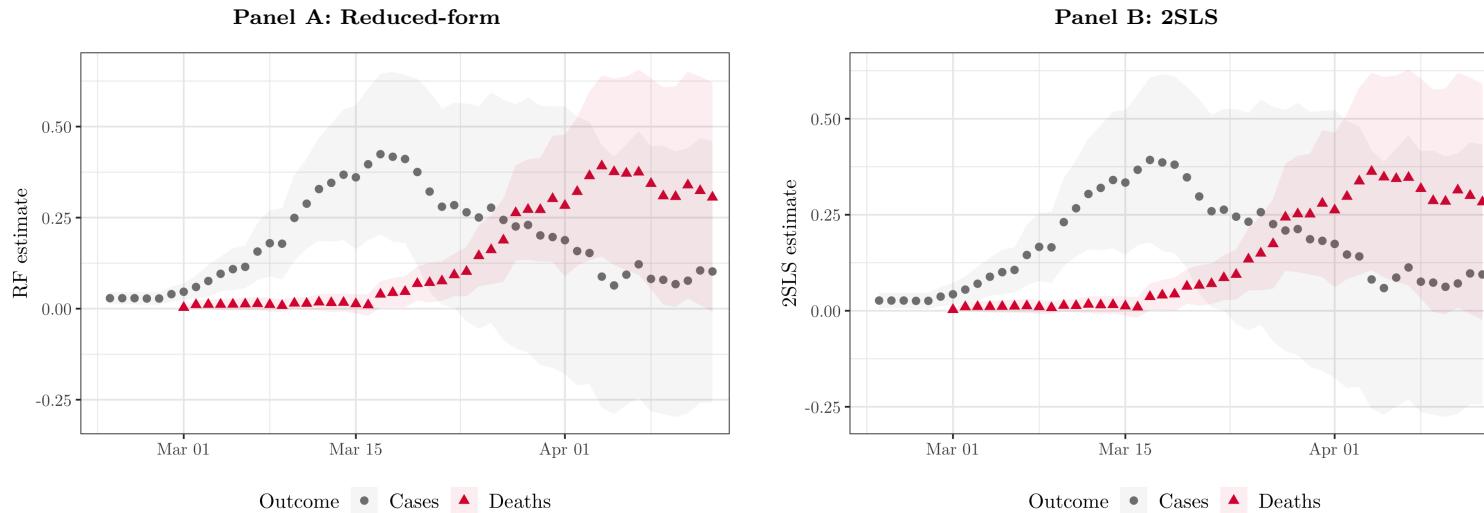
Notes: Figure 8 plots the coefficients from regressions of the standardized viewership difference between *Hannity* and *Tucker Carlson Tonight*, D_c , on our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding Hannity and *Tucker Carlson Tonight*. “Base controls” include the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News’ and MSNBC’s share of cable in 2018, Fox News’ share of television in January 2020, the population density of the county, and the log of the county’s total population. “Full controls” additionally include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county from 2018, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Robust standard errors are clustered at the DMA level. 95 percent confidence intervals are reported.

Figure 9: Residualized Hannity-Carlson instrument values



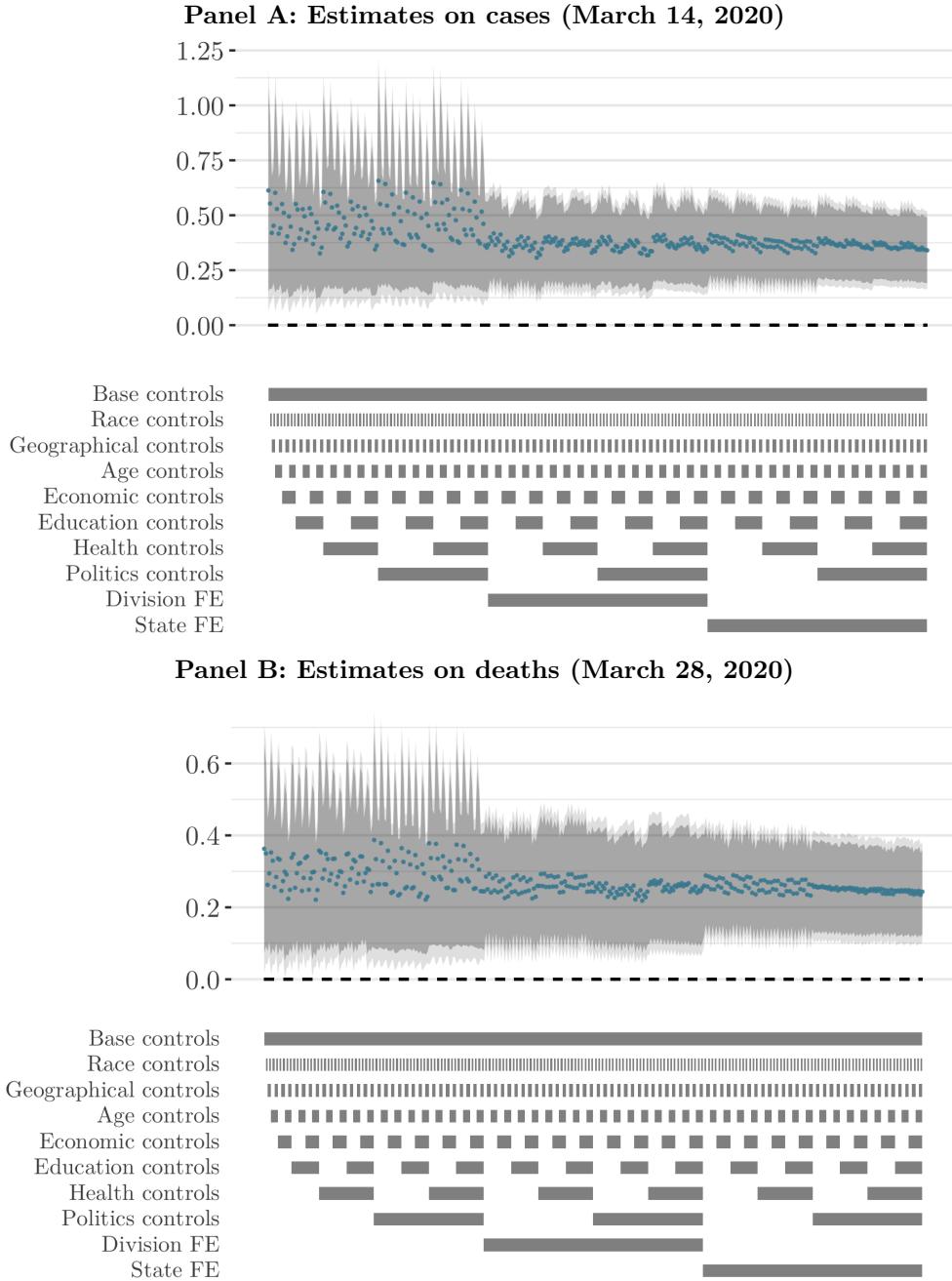
Notes: Figure 9 plots the values of our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$, residualized by our minimum set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the number of predicted TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*.

Figure 10: Reduced-form and 2SLS estimates of effect of differential viewership on cases and deaths



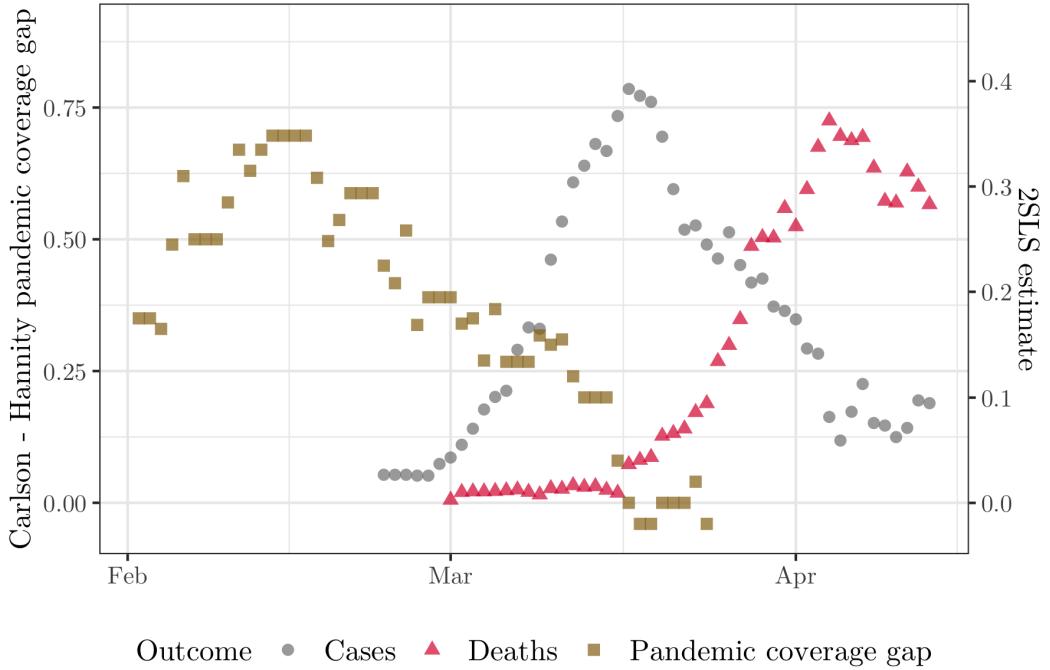
Notes: Figure 10 shows day-by-day reduced form (Panel A) and 2SLS (Panel B) estimates on $\log(1 + \text{cases})$ and $\log(1 + \text{deaths})$. In Panel A, we report day-by-day effects of our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShared}_d$, on log deaths and log cases, conditional on state fixed effects and a large set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the number of predicted TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. In Panel B, we report day-by-day effects of the standardized difference in viewership of *Hannity* vs. *Tucker Carlson Tonight*, instrumented by $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShared}_d$ and controlling for state fixed effects and the same set of covariates as in Panel A. We cluster standard errors at the DMA level and report 95 percent confidence intervals.

Figure 11: 2SLS: robustness to combinations of controls



Notes: Figure 11 shows robustness of our two-stage least squares estimates for the specifications for log one plus cases on March 14 (Panel A) and log one plus deaths on March 28 (Panel B) under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level and report 90 percent and 95 percent confidence intervals for each model. Blue points are significant at the 5 percent level; red points are significant at the 10 percent level; black points are not significant at the 10 percent level.

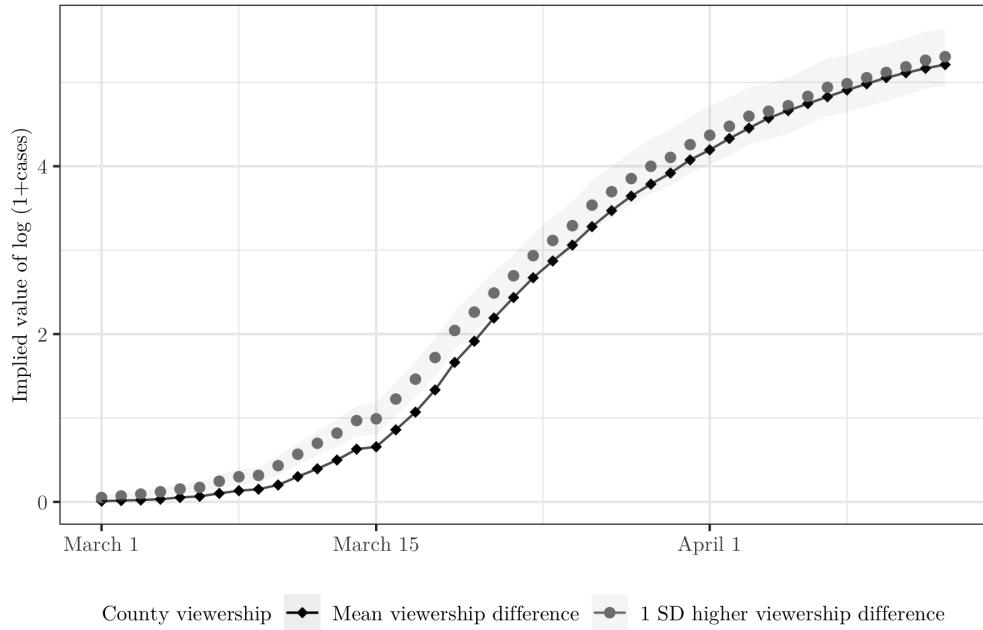
Figure 12: Carlson-Hannity pandemic coverage gap and effects on cases and deaths



Notes: Figure 12 shows, in brown squares corresponding to the left y -axis, the difference in portrayed seriousness of the coronavirus threat on *Tucker Carlson Tonight* vs. *Hannity*, as rated by Amazon Mechanical Turk coders. The difference peaks in mid-February, a period during which there was no discussion of the coronavirus on *Hannity* and during which *Tucker Carlson Tonight* discussed the coronavirus virtually every show. The figure also shows, in gray circles and red triangles corresponding to the right y -axis, 2SLS estimates of the Hannity-Carlson viewership gap (instrumented by $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$) on log one plus cases and log one plus deaths. All specifications control for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016.

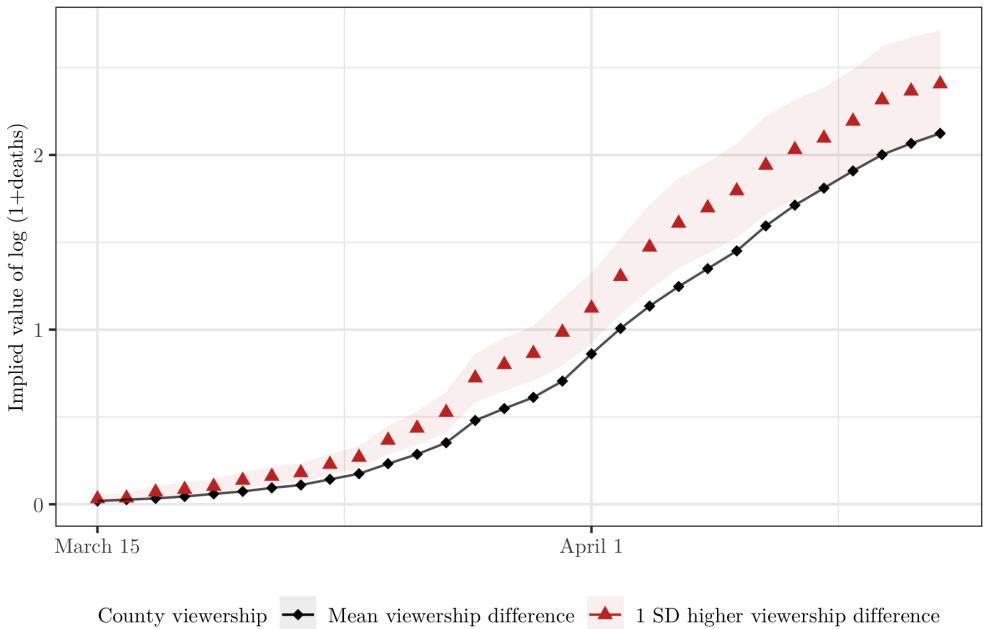
Figure 13: Implied COVID-19 curves

Panel A: Estimates on cases



County viewership \blacksquare Mean viewership difference \bullet 1 SD higher viewership difference

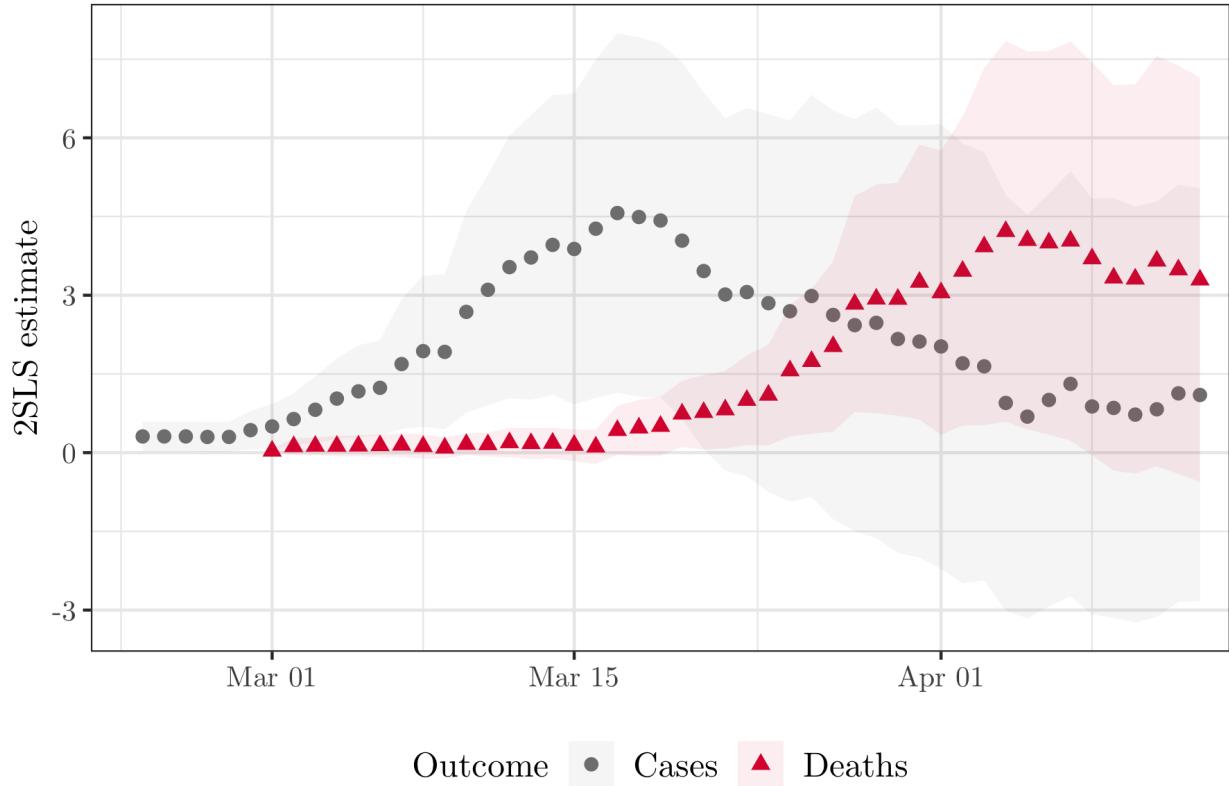
Panel B: Estimates on deaths



County viewership \blacksquare Mean viewership difference \blacktriangle 1 SD higher viewership difference

Notes: Panel A of Figure 13 plots, in black, the logarithm of (one plus the) mean number of cases in each day across all counties. In gray, the figure plots the the implied counterfactual values (based on our 2SLS estimates) for a county with a one standard deviation higher viewership difference between *Hannity* and *Tucker Carlson Tonight*. Panel B replicates Panel A, taking log one plus deaths as the outcome rather than log one plus cases. We report 95 percent confidence intervals on the counterfactual estimates. Standard errors are clustered at the DMA level.

Figure 14: 2SLS estimates of effect of the pandemic coverage index on cases and deaths



Notes: Figure 14 shows day-by-day 2SLS estimates from regressions of log one plus cases and log one plus deaths on the inverse of the pandemic coverage index described in Section 6, instrumented by $\widehat{\text{NonFoxHannity}_d \times \text{FoxShare}_d}$. All specifications control for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. We cluster standard errors at the DMA level and report 95 percent confidence intervals.

Tables

Table 1: Correlation between show viewership and timing of behavior change

	<i>Dependent variable:</i>			
	—			
	Change day	March 1	March 15	April 1
	(1)	(2)	(3)	(4)
Watches Hannity	5.001*** (1.322)	-0.128*** (0.034)	-0.082* (0.044)	-0.054** (0.025)
Watches Carlson	-2.304* (1.299)	0.088*** (0.033)	0.029 (0.043)	0.014 (0.025)
Watches another Fox show	-1.463 (1.281)	0.046 (0.033)	0.003 (0.043)	0.0002 (0.024)
p-value (Hannity=Carlson)	< 0.001	< 0.001	0.123	0.097
DV mean	39.016	0.163	0.680	0.922
Demographic controls	Yes	Yes	Yes	Yes
Other viewership controls	Yes	Yes	Yes	Yes
Observations	1,045	1,045	1,045	1,045
R ²	0.056	0.063	0.020	0.041

Notes: The dependent variable in Column 1 is the number of days after February 1, 2020 on which the respondent reported having significantly changed any of their behaviors in response to the coronavirus. For respondents who report not changing behavior by the date of the survey, we recode the dependent variable to the date of the survey (April 3). The dependent variables in Columns 2-4 are indicators for whether the respondent reported having significantly changed their behaviors before the date specified in the column header. Demographic controls include age, a white/not Hispanic indicator, a male indicator, a set of education indicators, and a set of household income indicators, and a set of employment indicators. Other viewership controls include indicators for whether the respondent watches CNN or MSNBC at least once a week. Robust standard errors are reported.

Table 2: Effect of differential viewership on cases

	<i>Dependent variable:</i>							
	COVID-19 cases							
	Feb 22 (1)	Feb 29 (2)	Mar 07 (3)	Mar 14 (4)	Mar 21 (5)	Mar 28 (6)	Apr 04 (7)	Apr 11 (8)
Panel A: Ordinary least squares								
Hannity-Carlson viewership difference	0.002 (0.002)	0.005** (0.002)	0.018* (0.010)	0.055** (0.022)	0.119*** (0.039)	0.112** (0.044)	0.103** (0.049)	0.082* (0.049)
Panel B: Reduced form								
Non-Fox TVs on \times Fox share	0.029*** (0.008)	0.040*** (0.010)	0.157*** (0.040)	0.368*** (0.091)	0.321** (0.140)	0.226 (0.171)	0.088 (0.183)	0.077 (0.186)
Panel C: Two-stage least squares								
H-C viewership difference (predicted)	0.027*** (0.010)	0.037*** (0.013)	0.145*** (0.040)	0.340*** (0.091)	0.298** (0.129)	0.209 (0.160)	0.081 (0.172)	0.071 (0.173)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of one plus the cumulative number of COVID-19 cases in the county as of the date referenced in the column. Panel A reports OLS estimates of the log of one plus cases upon the standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the log of one plus cases upon the instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShared}_d$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the log of one plus cases upon the standardized difference in Hannity-Carlson viewership, instrumented by $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShared}_d$. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Table 3: Effect of differential viewership on deaths

	Dependent variable:						
	COVID-19 deaths						
	Feb 29 (1)	Mar 07 (2)	Mar 14 (3)	Mar 21 (4)	Mar 28 (5)	Apr 04 (6)	Apr 11 (7)
Panel A: Ordinary least squares							
Hannity-Carlson viewership difference	0.0004 (0.0005)	0.002 (0.003)	0.001 (0.004)	0.018* (0.009)	0.051** (0.023)	0.079** (0.034)	0.105** (0.041)
Panel B: Reduced form							
Non-Fox TVs on \times Fox share	0.003* (0.002)	0.013 (0.009)	0.017 (0.012)	0.071** (0.028)	0.263*** (0.066)	0.392*** (0.127)	0.339** (0.159)
Panel C: Two-stage least squares							
H-C viewership difference (predicted)	0.003 (0.002)	0.012 (0.009)	0.016 (0.012)	0.066** (0.027)	0.244*** (0.071)	0.363*** (0.131)	0.314** (0.156)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of one plus the cumulative number of COVID-19 deaths in the county as of the date referenced in the column. Panel A reports OLS estimates of the log of one plus deaths upon the standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the log of one plus deaths upon the instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the log of one plus deaths upon the standardized difference in Hannity-Carlson viewership, instrumented by $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Table 4: Differential coverage and COVID-19 outcomes across all Fox News evening shows

	Dependent variable:				Cases	Deaths
	Inverse pandemic coverage index				Mar 14	Mar 28
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: OLS: inverse pandemic coverage index on relative viewership						
H-C viewership difference	0.129*** (0.008)	0.129*** (0.008)				
Panel B: RF: inverse pandemic coverage index on instrument						
NonFoxHannity _d × FoxShare _d		0.089*** (0.031)	0.093*** (0.031)			
Panel C: 2SLS: cases and deaths on inverse predicted pandemic coverage index						
–1 × coverage index (predicted)				3.960*** (1.456)	2.833*** (1.051)	
Base controls	Yes	Yes	Yes	Yes	Yes	Yes
Main controls	No	Yes	No	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102

Notes: Panel A reports OLS estimates of the (inverse of the) pandemic coverage index on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*. Panel B reports reduced-form estimates of the inverse pandemic coverage index on our instrument, NonFoxHannity_d × FoxShare_d — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Columns (5) and (6) in Panel C report 2SLS estimates of the log of one plus the number of cases on March 14 and the log of one plus the number of deaths on March 28, respectively, on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*, instrumented by NonFoxHannity_d × FoxShare_d. Base OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, and the log of the county's total population. Base controls for the reduced form and the two-stage least squares are identical, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Main controls for both OLS and IV include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Supplementary Appendix: not for publication

Our supplementary material is organized as follows. In Appendix A, we report appendix figures and tables referenced in the main body of the text. In Appendix B, we report versions of the figures and tables included in the main text, but using the alternative instrument described in Section 5.3.4. In Appendix C, we report versions of the figures and tables included in the main text, but with cases and deaths transformed by the inverse hyperbolic sine rather than the natural logarithm. In Appendix D, we include a copy of the survey instrument described in Section 3.

A Appendix Tables and Figures

A.1 Survey

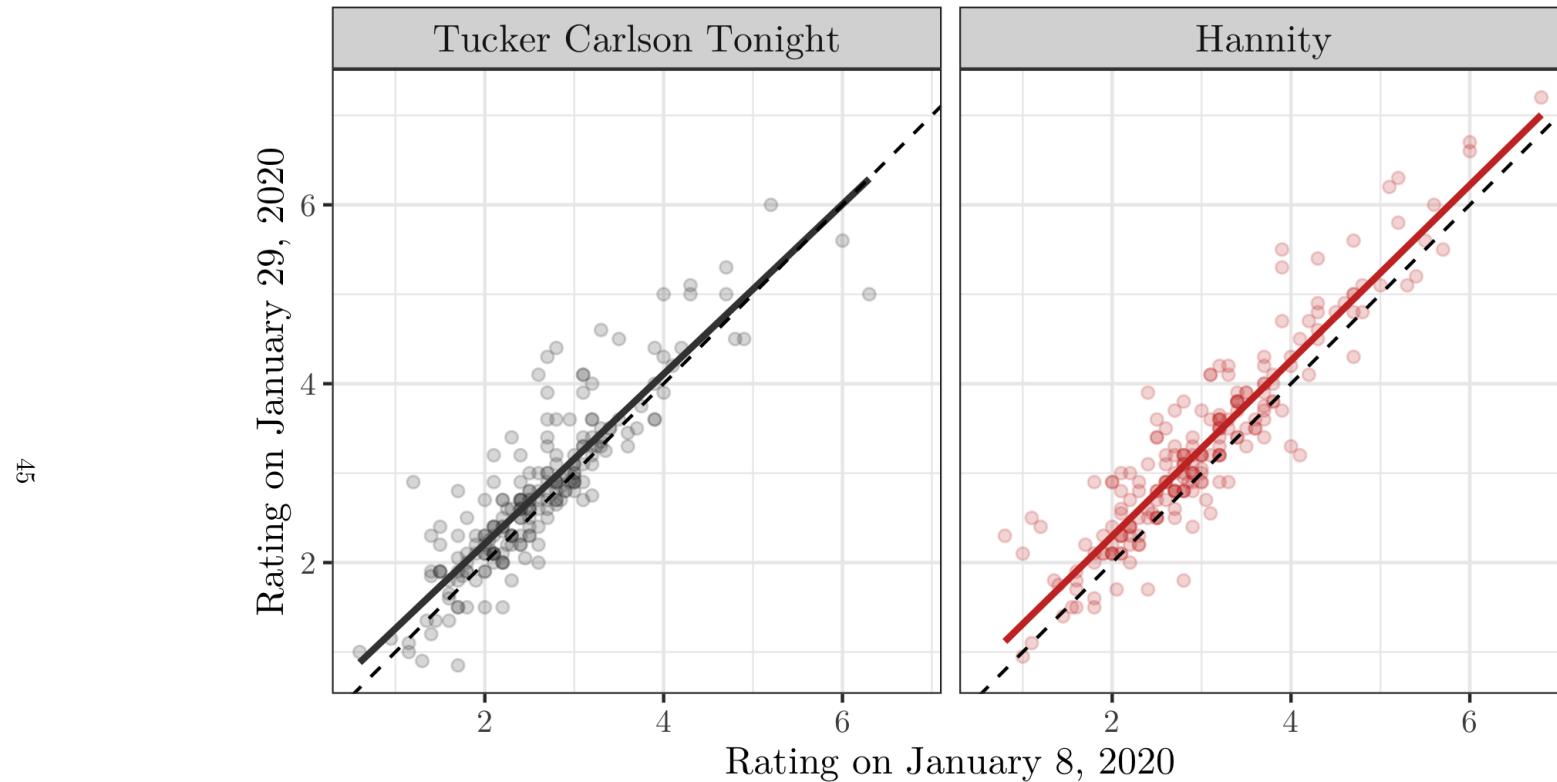
Table A1: Sample representativeness

Variables:	Survey	Gallup
Male	0.57	0.50
Age	65.16	68.80
Race: White	0.95	0.94
At least high school degree	0.99	0.96
At least some college education	0.80	0.67
Employed full-time	0.26	0.27
Annual household income (USD)	70657.09	60299.89
Observations	1480	12932

Notes: Summary statistics of Republicans aged 55 and above from the survey and the 2015 Gallup microdata.

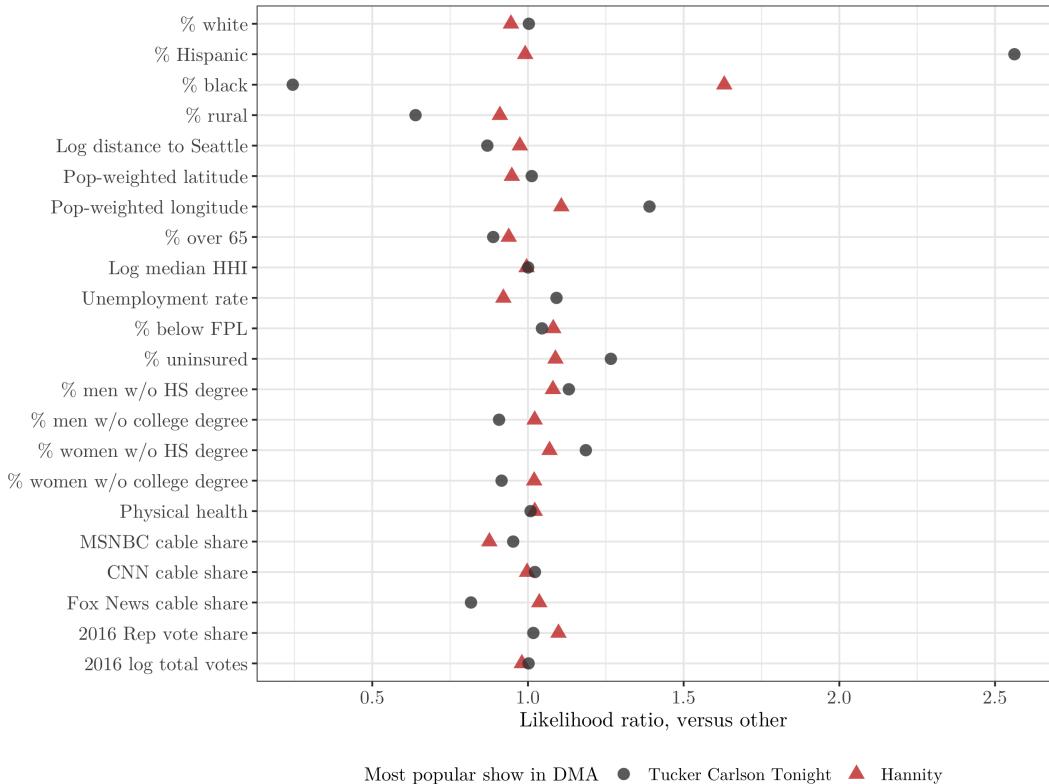
A.2 Data and OLS

Figure A1: Rating persistence between early and late January



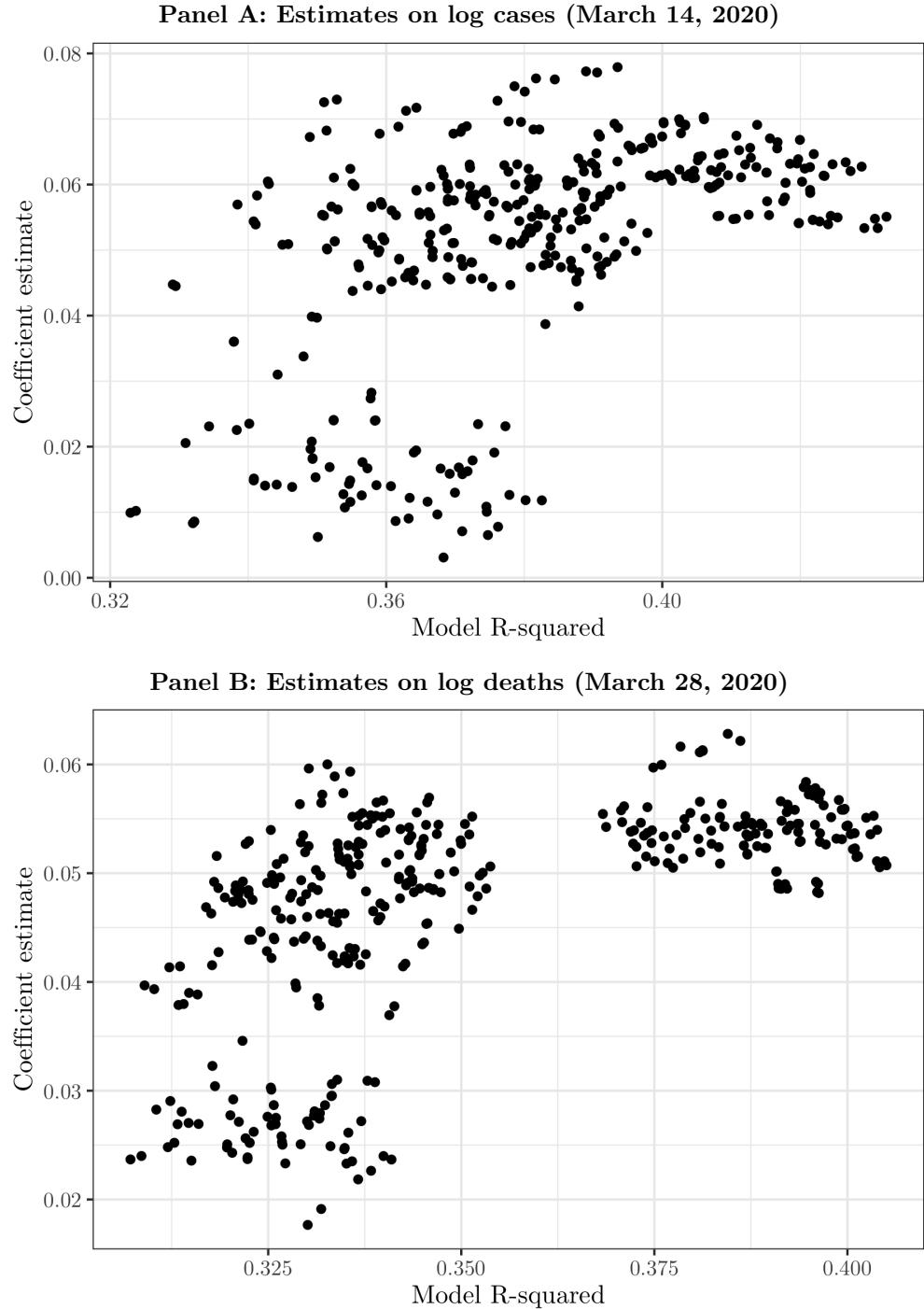
Notes: Figure A1 plots, separately for *Hannity* and *Tucker Carlson Tonight*, the rating in each DMA on Wednesday, January 29, 2020 (the last day for which we have data) and on Wednesday, January 8, 2020 (three weeks prior). The dotted line is the 45-degree line indicating equal ratings across the two dates.

Figure A2: Selection into watching Hannity versus Carlson



Notes: For each demographic characteristic, Figure A2 shows, in blue, ratios of the average value among counties in which *Hannity* is the most popular show relative to the average value among counties in which neither *Hannity* nor *Tucker Carlson Tonight* is the most popular show. Similarly, Figure A2 shows, in red, ratios of the average value among counties in which *Tucker Carlson Tonight* is the most popular show relative to the average value among counties in which neither *Hannity* nor *Tucker Carlson Tonight* is the most popular show.

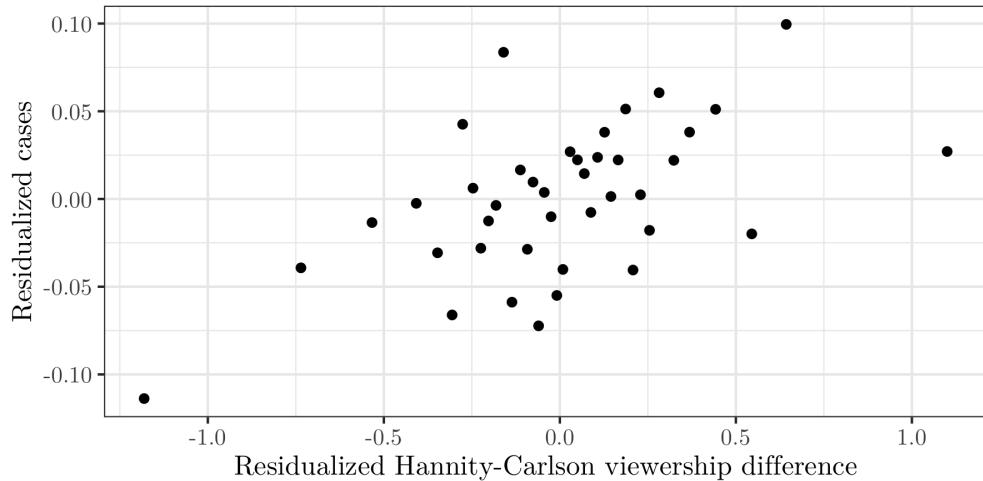
Figure A3: OLS: R^2 vs. coefficient estimates under combinations of controls



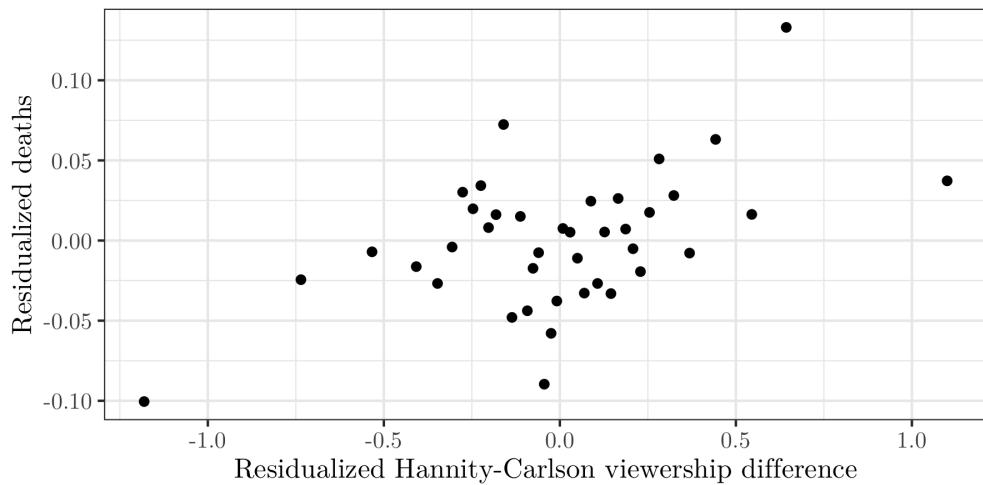
Notes: Figure A3 shows the relationship between the OLS coefficient estimates (y -axis) and the model R^2 (x -axis) for log cases on March 14 (Panel A) and for log deaths on March 28 (Panel B) from specifications with every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level.

Figure A4: OLS: residual-residual plot

Panel A: Estimates on log cases (March 14, 2020)



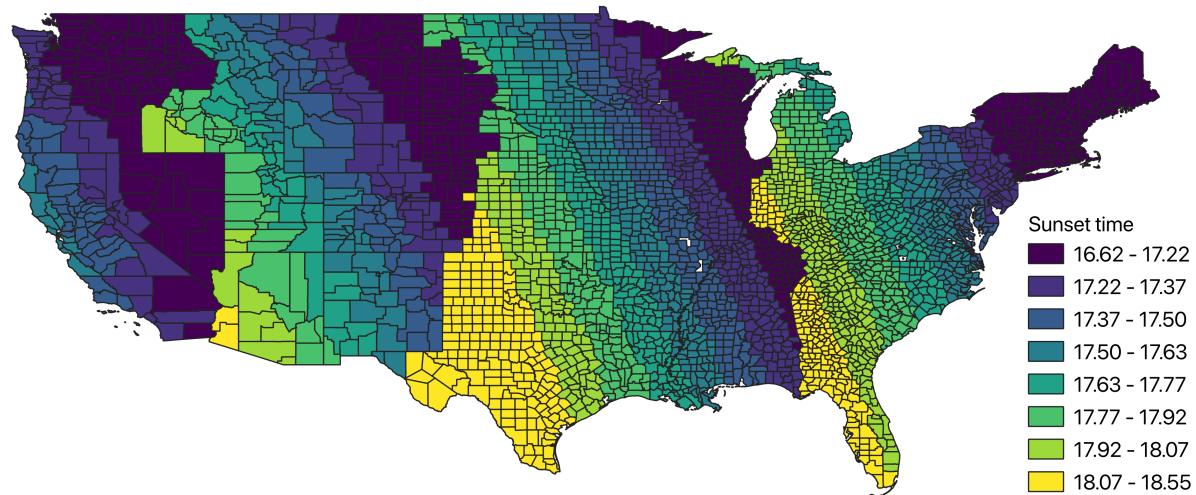
Panel B: Estimates on log deaths (March 28, 2020)



Notes: Figure A4 displays a binscatter of the residuals of log one plus cases (Panel A) and log one plus deaths (Panel B) on the residuals of the standardized difference in viewership, where both outcome variables and the standardized difference in viewership are residualized by state fixed effects and our full set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016.

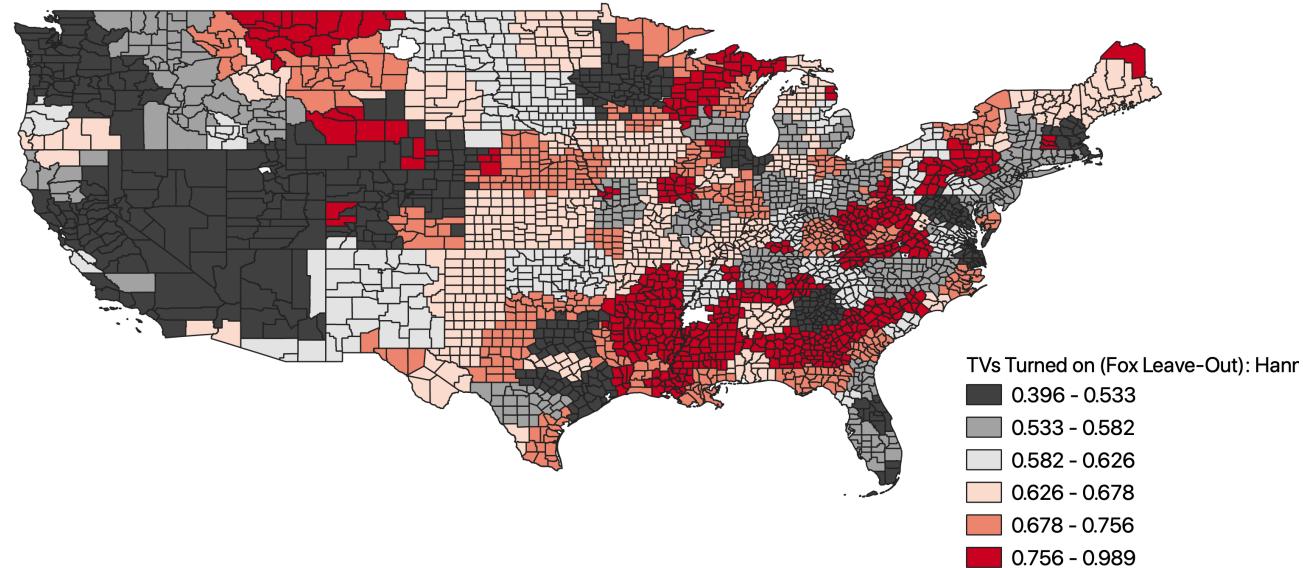
A.3 Construction of Instrument

Figure A5: Sunset time on February 1, 2020 by county



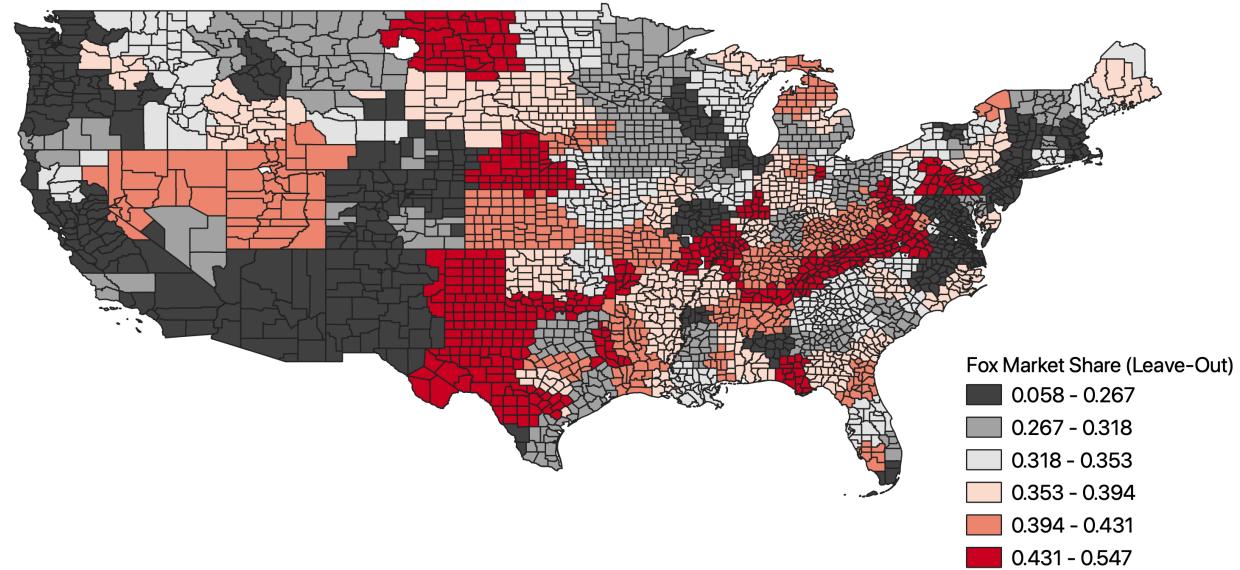
Notes: Map plots the time of sunset on February 1, 2020 for each county in the continental United States. Data from www.timeanddate.com.

Figure A6: Predicted number of TVs turned on during *Hannity*, leaving out TVs watching *Hannity*



Notes: For each of the 207 DMAs in the continental United States, Figure A6 plots the predicted number of TVs turned on and tuned to non-Fox channels (i.e. TVs that are turned on and not watching *Hannity*) during the timeslot when *Hannity* airs, 9PM Eastern Time.

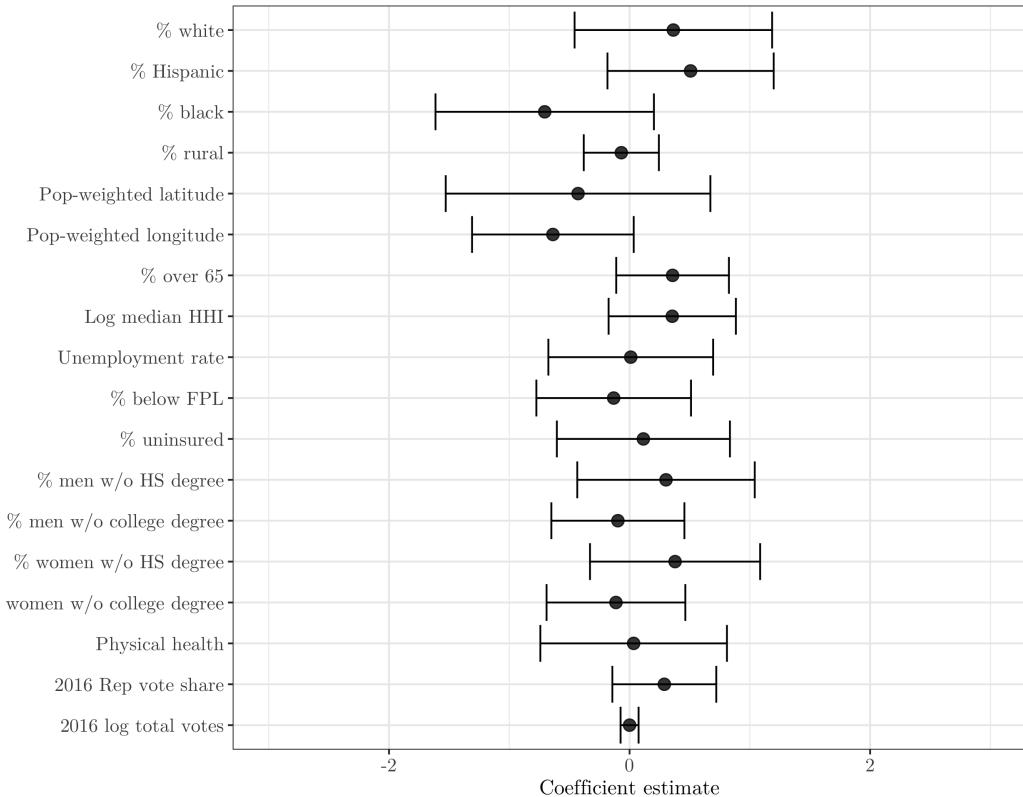
Figure A7: Fox News viewership share, leaving out *Hannity* and *Tucker Carlson Tonight*



Notes: For each of the 207 DMAs in the continental United States, Figure A7 plots the market share of Fox News in January 2020, leaving out viewership of *Hannity* and *Tucker Carlson Tonight*.

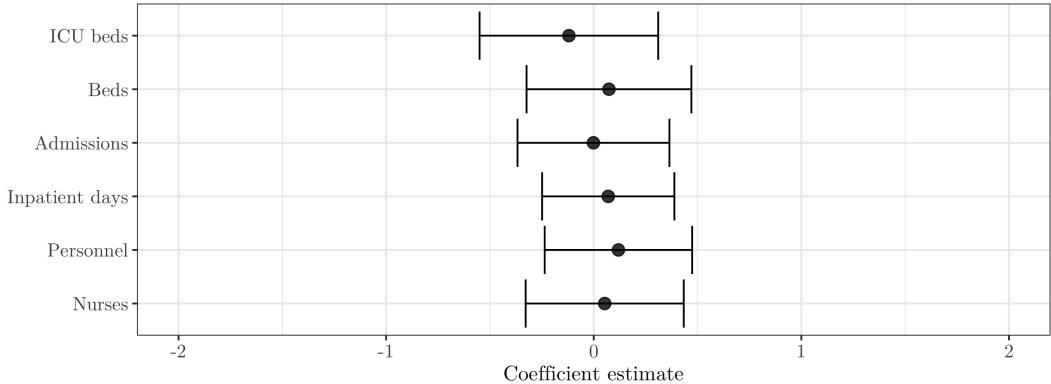
A.4 Instrument Exclusion, First Stage, and Robustness

Figure A8: Instrument correlation with county-level demographics



Notes: Figure A8 shows the coefficients from a series of regressions of each demographic characteristic on our instrument, $\widehat{\text{NonFoxHannity}}_d \times \text{FoxShare}_d$, conditional on the two interactants, $\widehat{\text{NonFoxHannity}}_d$ and FoxShare_d , and a small set of other controls accounting for local viewership patterns (the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the local viewership share of MSNBC, and population size and density). All dependent variables are scaled to a standard normal distribution. We cluster standard errors at the DMA level and report 95 percent confidence intervals.

Figure A9: Instrument correlation with local health system capacity



Notes: Figure A9 shows the coefficients from a series of regressions of each proxy for health system capacity on our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$, conditional on the two interactants, $\widehat{\text{NonFoxHannity}_d}$ and FoxShare_d , and a small set of other controls accounting for local viewership patterns (the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the local viewership share of MSNBC, and population size and density). All dependent variables are in per capita terms and are scaled to a standard normal distribution. We cluster standard errors at the DMA level and report 95 percent confidence intervals.

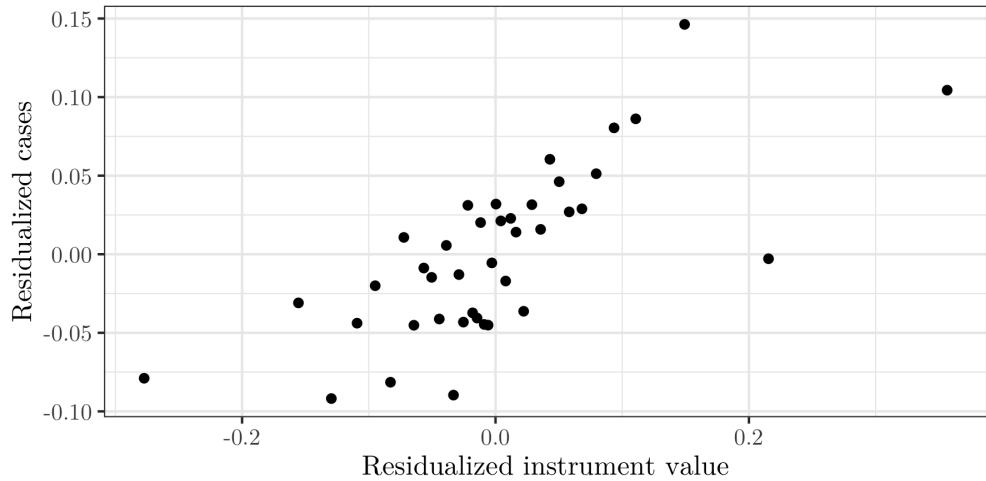
Table A2: First-stage regressions

	Dependent variable:					
	Difference in Hannity-Carlson viewership					
	(1)	(2)	(3)	(4)	(5)	(6)
Non-Fox TVs on \times Fox share	0.810*** (0.283)	1.116*** (0.232)	1.048*** (0.198)	1.054*** (0.289)	1.076*** (0.230)	1.080*** (0.198)
F-statistic	8.190	23.190	27.940	13.280	21.820	29.720
Controls	Base	Base	Base	All	All	All
Fixed effects	None	Division	State	None	Division	State
Observations	3,103	3,103	3,103	3,102	3,102	3,102
R ²	0.694	0.828	0.864	0.756	0.835	0.869

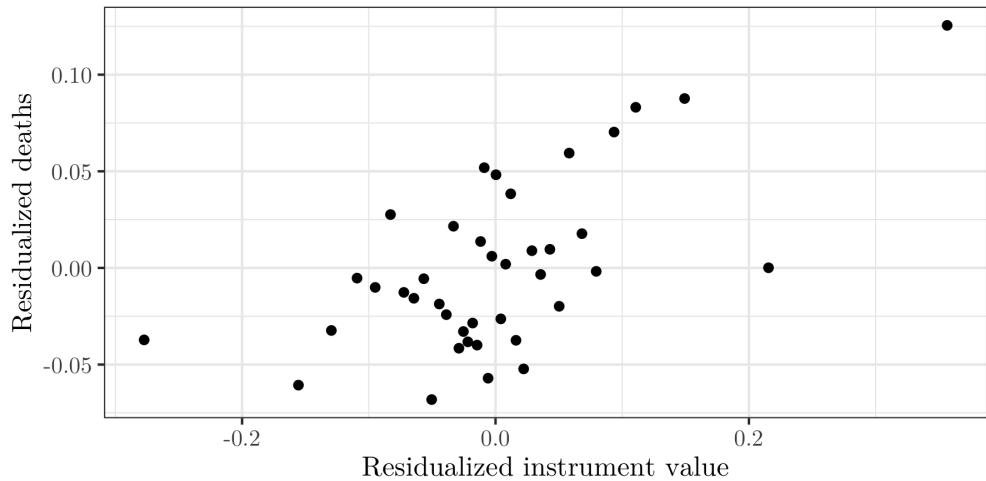
Notes: Table reports regressions of the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight* on our instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. “Base controls” include the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News’ and MSNBC’s share of cable in January 2018, Fox News’ share of television in January 2020, the population density of the county, and the log of the county’s total population. “All controls” additionally include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Figure A10: IV: residual-residual plot

Panel A: Estimates on log cases (March 14, 2020)



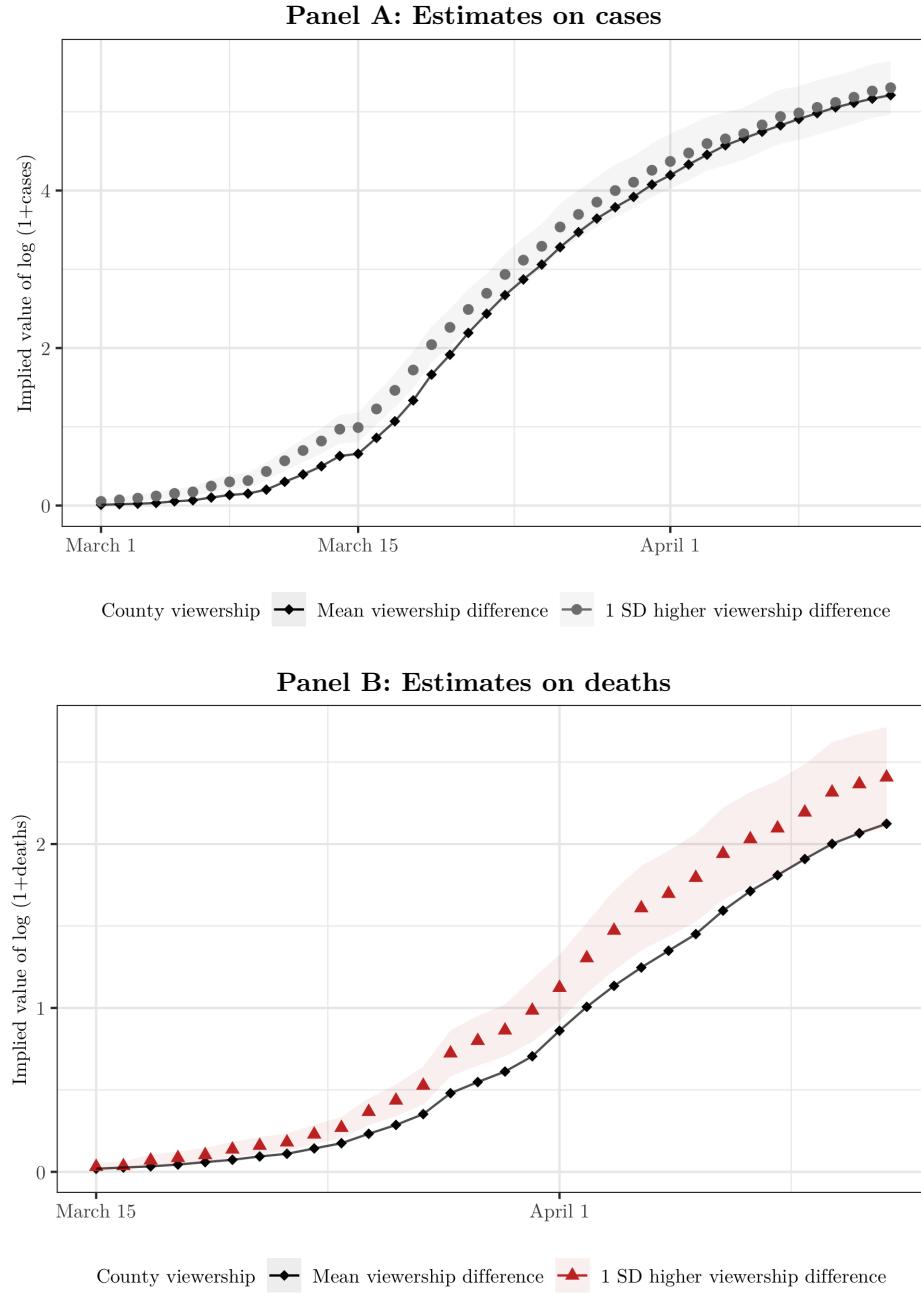
Panel B: Estimates on log deaths (March 28, 2020)



Notes: Figure A10 displays a binscatter of the residuals of log one plus cases (Panel A) and log one plus deaths (Panel B) on the residuals of $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$, where both outcome variables and the instrument are residualized by state fixed effects and our full set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, an age-adjusted measure of the average physical health in the county from 2018, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016.

A.5 Effect sizes

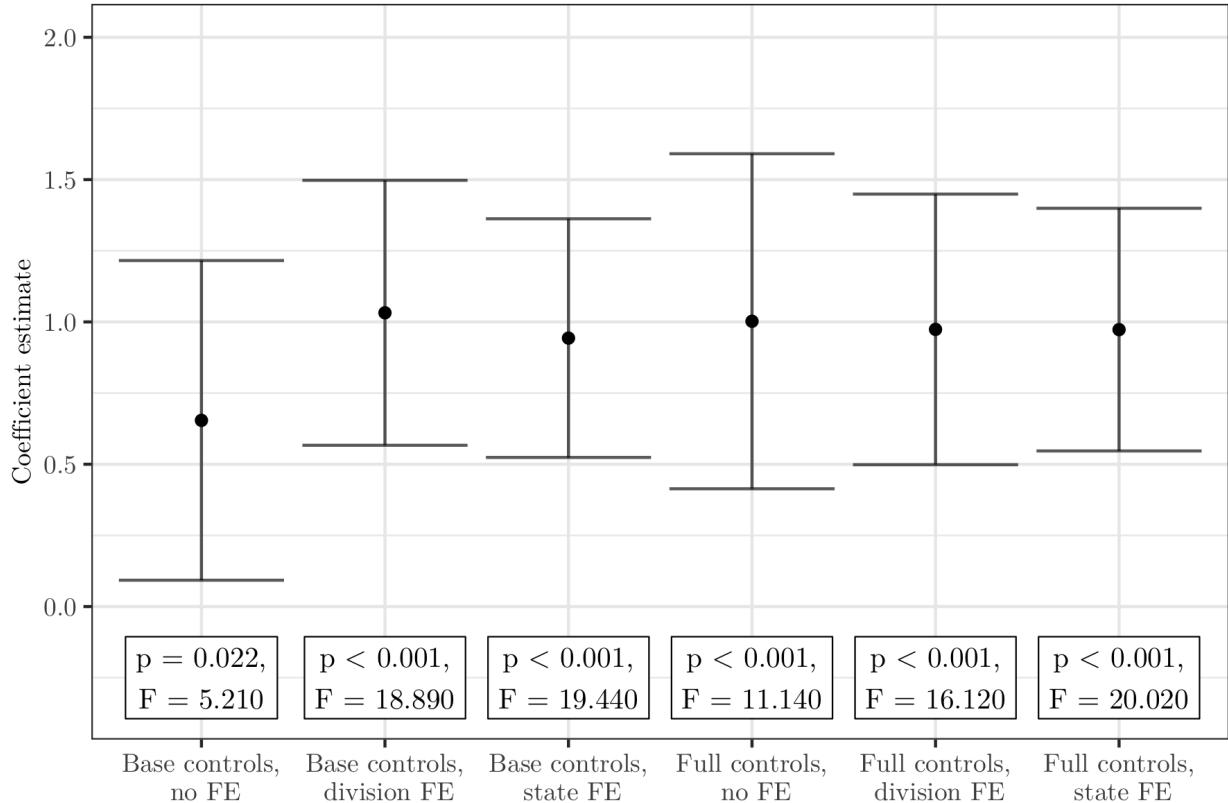
Figure A11: Implied COVID-19 curves (OLS)



Notes: Panel A of Figure A11 plots, in black, the logarithm of (one plus the) mean number of cases in each day across all counties. In gray, the figure plots the the implied counterfactual values (based on our OLS estimates) for a county with a one standard deviation higher viewership difference between *Hannity* and *Tucker Carlson Tonight*. Panel B replicates Panel A, taking log one plus deaths as the outcome rather than log one plus cases. We report 95 percent confidence intervals on the counterfactual estimates. Standard errors are clustered at the DMA level.

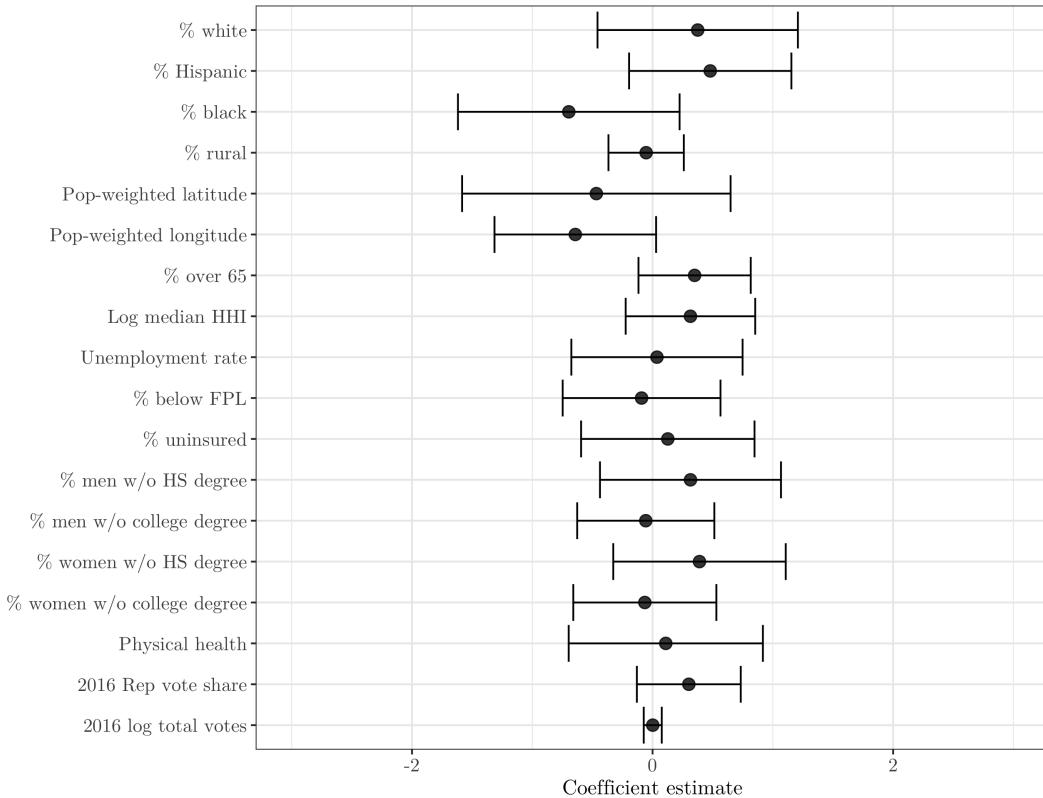
B Robustness Check: Non-Fox TV instrument

Figure B1: Instrument first stage on relative viewership



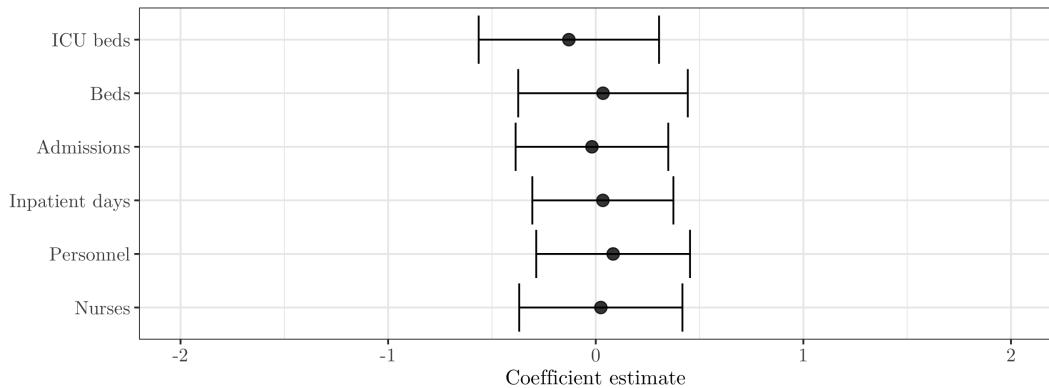
Notes: Figure B1 plots the coefficients from regressions of the standardized viewership difference between *Hannity* and *Tucker Carlson Tonight*, D_c , on our instrument, $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ — that is, the number of TVs on during *Hannity*'s timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. “Base controls” include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News’ and MSNBC’s share of cable in 2018, Fox News’ share of television in January 2020, the population density of the county, and the log of the county’s total population. “Full controls” additionally include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Robust standard errors are clustered at the DMA level. 95% confidence intervals are reported.

Figure B2: Instrument correlation with county-level demographics



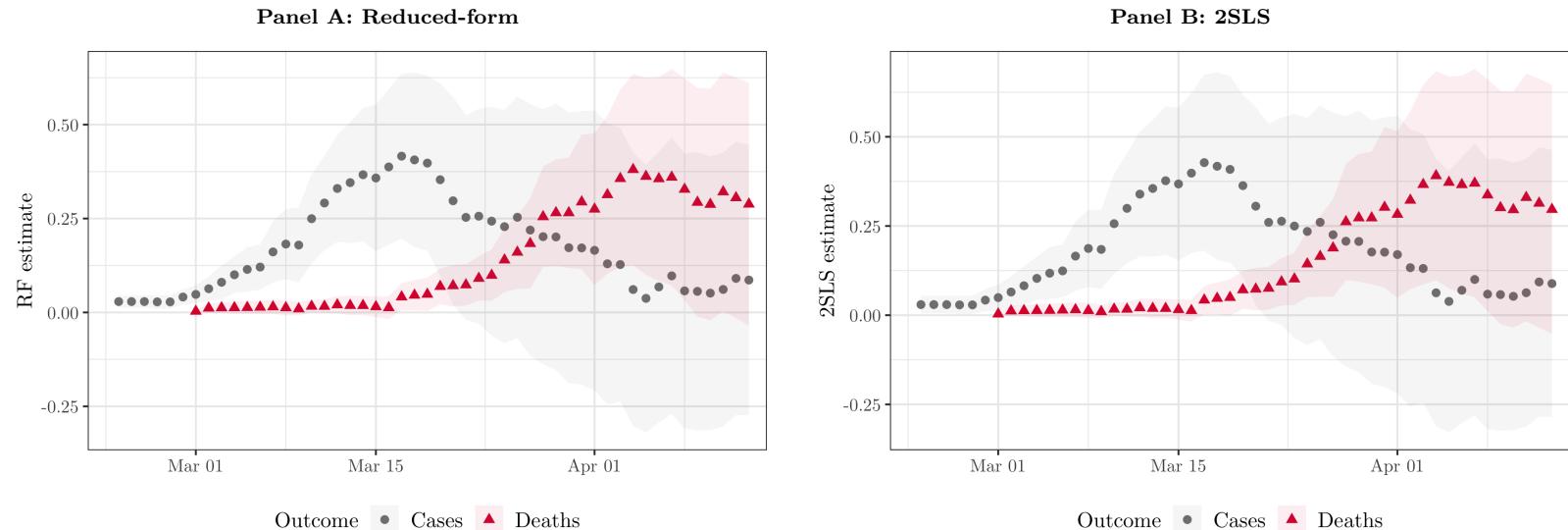
Notes: Figure B2 shows the coefficients from a series of regressions of each demographic characteristic on our instrument, $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ — that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight* — conditional on the two interactants and a small set of other controls accounting for local viewership patterns (the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the local viewership share of MSNBC, and population size and density). All dependent variables are scaled to a standard normal distribution. We cluster standard errors at the DMA level and report 95% confidence intervals.

Figure B3: Instrument correlation with local health system capacity



Notes: Figure B3 shows the coefficients from a series of regressions of each proxy for health system capacity on our instrument, $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ — that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight* — conditional on the two interactants and a small set of other controls accounting for local viewership patterns (the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the local viewership share of MSNBC, and population size and density). All dependent variables are in per capita terms and are scaled to a standard normal distribution. We cluster standard errors at the DMA level and report 95% confidence intervals.

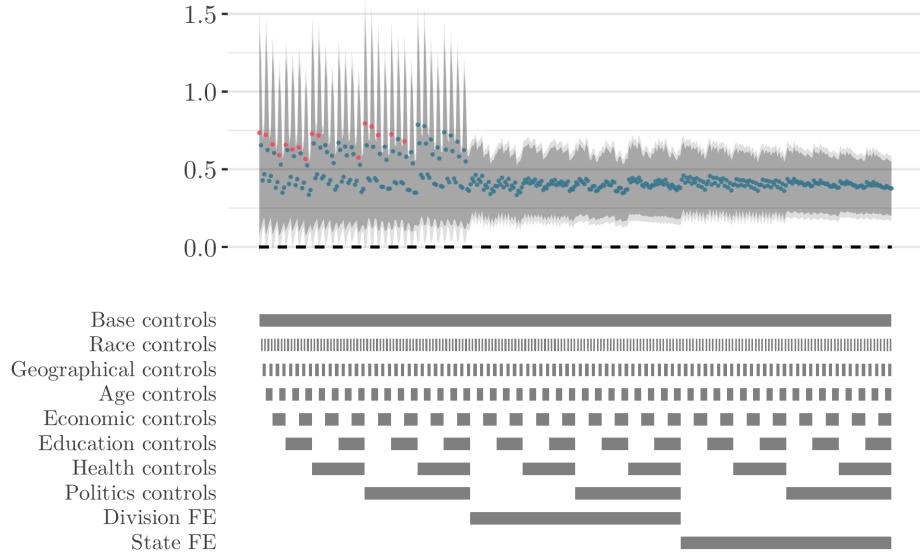
Figure B4: Reduced-form and 2SLS coefficient estimates on cases and deaths



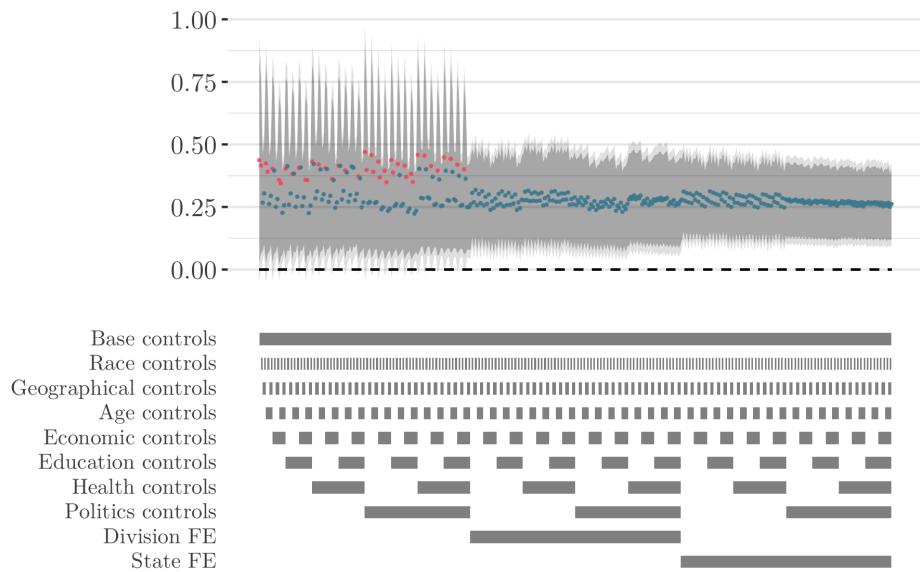
Notes: Figure B4 shows day-by-day reduced form (Panel A) and 2SLS (Panel B) estimates on log one plus cases and log one plus deaths. In Panel A, we report day-by-day effects of our alternative instrument, $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ — that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight* — on log deaths and log cases, conditional state fixed effects and a large set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the number of predicted TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. In Panel B, we report day-by-day effects of the standardized difference in viewership of *Hannity* vs. *Tucker Carlson Tonight*, instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ and controlling for state fixed effects and the same set of covariates as in Panel A. We cluster standard errors at the DMA level and report 95% confidence intervals.

Figure B5: 2SLS: robustness to combinations of controls

Panel A: Estimates on cases (March 14, 2020)

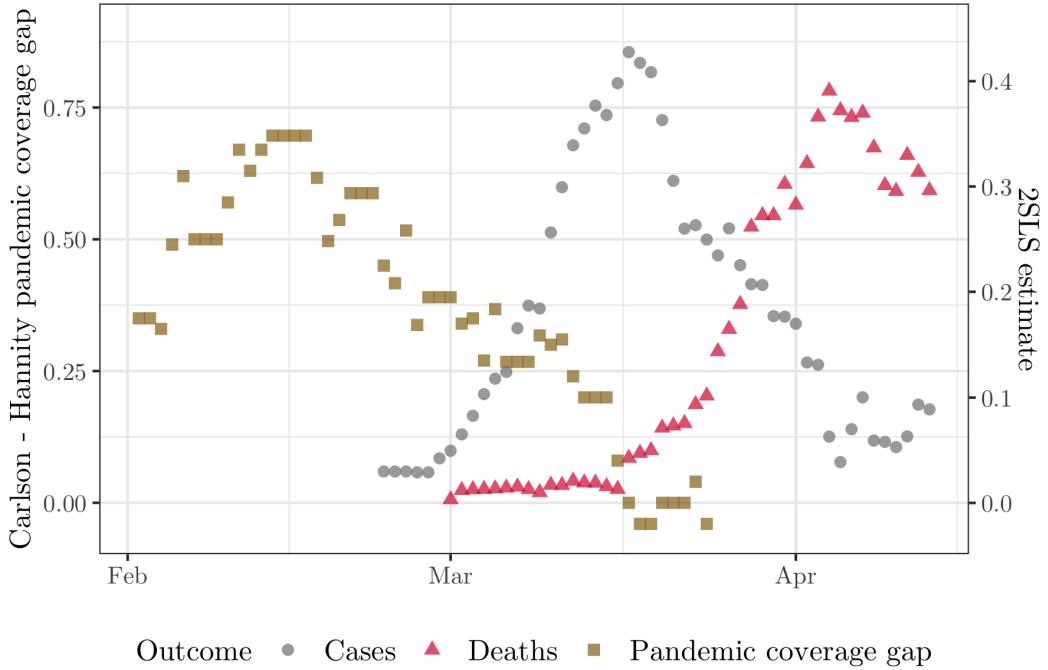


Panel B: Estimates on deaths (March 28, 2020)



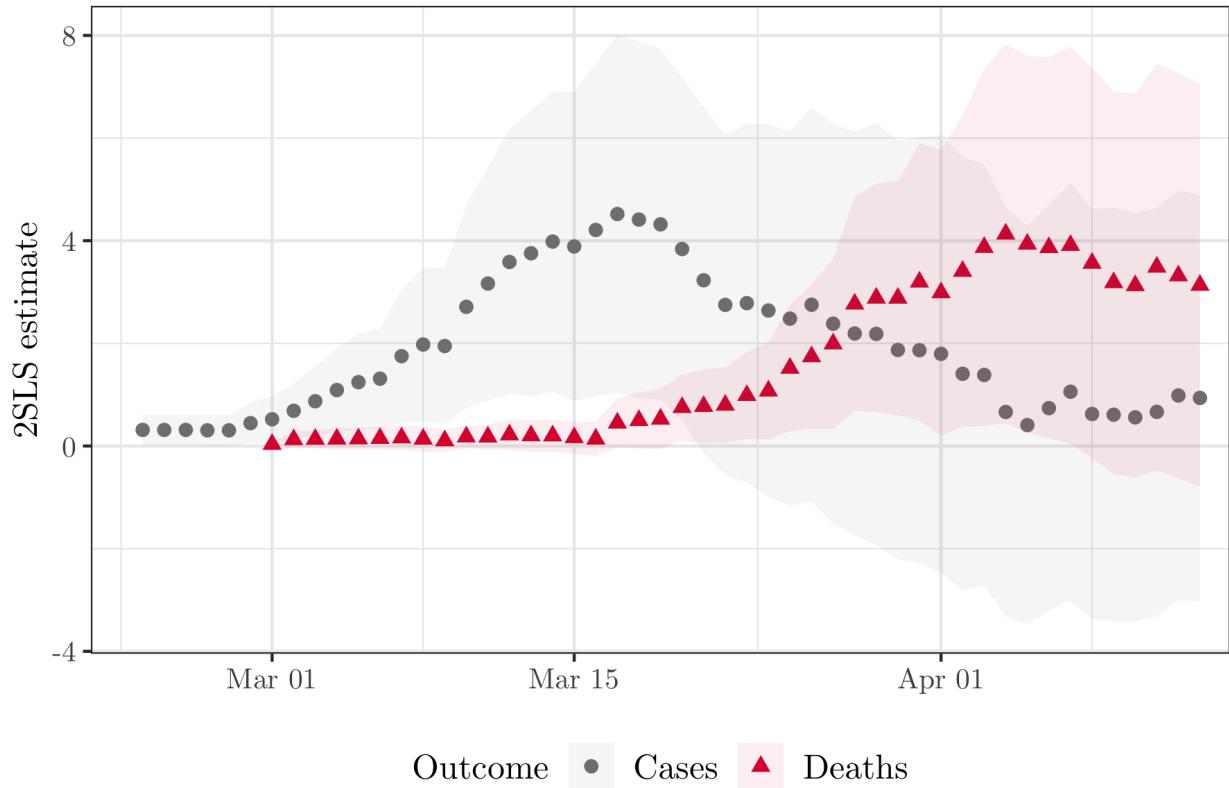
Notes: Figure B5 shows robustness of our two-stage least squares estimates for the specifications for log cases on March 14 (Panel A) and log deaths on March 28 (Panel B) under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level and report 90% and 95% confidence intervals for each model. Blue points are significant at the 5% level; red points are significant at the 10% level; black points are not significant at the 10% level.

Figure B6: Carlson-Hannity pandemic coverage gap and effects on cases and deaths



Notes: Figure B6 shows, in brown squares corresponding to the left y -axis, the difference in portrayed seriousness of the coronavirus threat on *Tucker Carlson Tonight* vs. *Hannity*, as rated by Amazon Mechanical Turk coders. The difference peaks in mid-February, a period during which there was no discussion of the coronavirus on *Hannity* and during which *Tucker Carlson Tonight* discussed the coronavirus virtually every show. The figure also shows, in gray circles and red triangles corresponding to the right y -axis, 2SLS estimates of the Hannity-Carlson viewership gap (instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$) on log one plus cases and log one plus deaths. All specifications control for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016.

Figure B7: 2SLS estimates of effect of the pandemic coverage index on cases and deaths



Notes: Figure B7 shows day-by-day 2SLS estimates on log one plus cases and log one plus deaths on the coverage gap described in Section 6. The figure reports estimates from 2SLS regressions of each outcome on the coverage gap, instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$, controlling for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. We cluster standard errors at the DMA level and report 95% confidence intervals.

Table B1: Effect of differential viewership on cases (robustness: alternative instrument)

	<i>Dependent variable:</i>							
	COVID-19 cases							
	Feb 22 (1)	Feb 29 (2)	Mar 07 (3)	Mar 14 (4)	Mar 21 (5)	Mar 28 (6)	Apr 04 (7)	Apr 11 (8)
Panel A: Ordinary least squares								
Hannity-Carlson viewership difference	0.002 (0.002)	0.005** (0.002)	0.018* (0.010)	0.055** (0.022)	0.119*** (0.039)	0.112** (0.044)	0.103** (0.049)	0.082* (0.049)
Panel B: Reduced form								
Non-Fox TVs on \times Fox share	0.029*** (0.009)	0.041*** (0.010)	0.161*** (0.041)	0.367*** (0.091)	0.297** (0.141)	0.202 (0.173)	0.061 (0.185)	0.061 (0.186)
Panel C: Two-stage least squares								
H-C viewership difference (predicted)	0.030** (0.013)	0.042*** (0.016)	0.166*** (0.049)	0.377*** (0.106)	0.305** (0.141)	0.207 (0.179)	0.063 (0.191)	0.063 (0.191)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of 1 plus the cumulative number of COVID-19 cases in the county as of the date referenced in the column. Panel A reports OLS estimates of the log of one plus cases upon standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the log of one plus cases upon the instrument, NonFoxHannity_d \times FoxShare_d—that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the log of one plus cases upon the standardized difference in Hannity-Carlson viewership, instrumented by NonFoxHannity_d \times FoxShare_d. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Table B2: Effect of differential viewership on deaths (robustness: alternative instrument)

	Dependent variable:						
	COVID-19 deaths						
	Feb 29 (1)	Mar 07 (2)	Mar 14 (3)	Mar 21 (4)	Mar 28 (5)	Apr 04 (6)	Apr 11 (7)
Panel A: Ordinary least squares							
Hannity-Carlson viewership difference	0.0004 (0.0005)	0.002 (0.003)	0.001 (0.004)	0.018* (0.009)	0.051** (0.023)	0.079** (0.034)	0.105** (0.041)
Panel B: Reduced form							
Non-Fox TVs on \times Fox share	0.003* (0.002)	0.015 (0.010)	0.018 (0.013)	0.071** (0.028)	0.255*** (0.068)	0.380*** (0.130)	0.321** (0.162)
Panel C: Two-stage least squares							
H-C viewership difference (predicted)	0.003 (0.002)	0.015 (0.011)	0.019 (0.014)	0.073** (0.031)	0.262*** (0.083)	0.391*** (0.149)	0.330* (0.177)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of 1 plus the cumulative number of COVID-19 deaths in the county as of the date referenced in the column. Panel A reports OLS estimates of the log of one plus deaths upon standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the log of one plus deaths upon the instrument, NonFoxHannity_d \times FoxShare_d—that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the log of one plus deaths upon the standardized difference in Hannity-Carlson viewership, instrumented by NonFoxHannity_d \times FoxShare_d. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

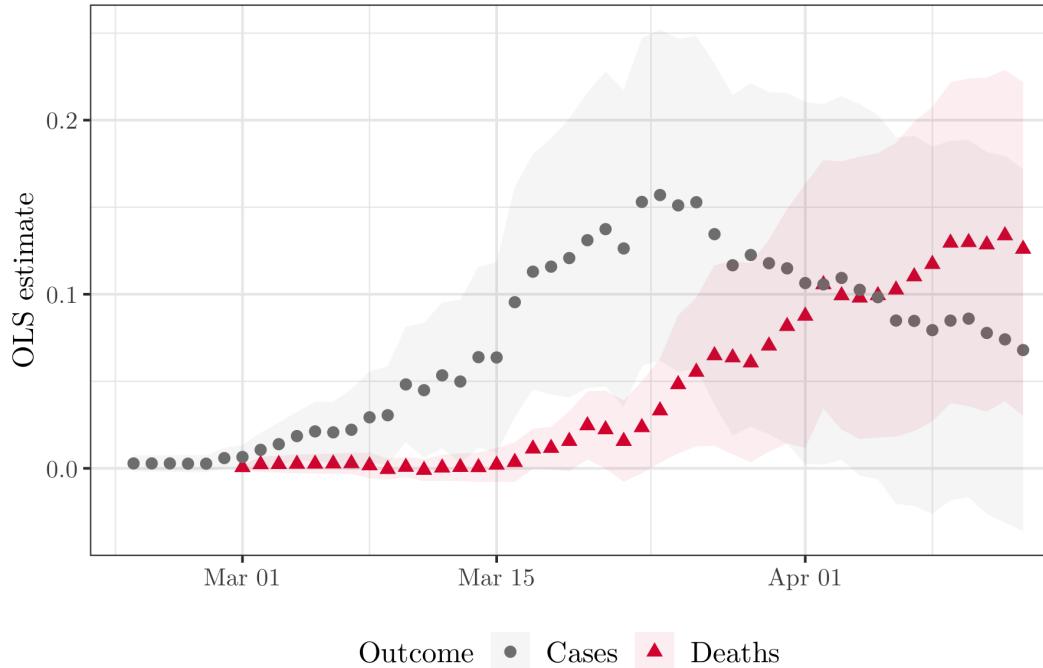
Table B3: Differential coverage and COVID-19 outcomes across all Fox News evening shows

	<i>Dependent variable:</i>					
	Inverse pandemic coverage index				Cases	Deaths
	(1)	(2)	(3)	(4)	Mar 14	Mar 28
Panel A: OLS: inverse pandemic coverage index on relative viewership						
H-C viewership difference	0.129*** (0.008)	0.129*** (0.008)				
Panel B: RF: inverse pandemic coverage index on instrument						
NonFoxHannity _d × FoxShare _d		0.088*** (0.032)	0.092*** (0.032)			
Panel C: 2SLS: cases and deaths on inverse predicted pandemic coverage index						
–1 × coverage index (predicted)				3.984*** (1.493)	2.768*** (1.059)	
Base controls	Yes	Yes	Yes	Yes	Yes	Yes
Main controls	No	Yes	No	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102

Notes: Panel A reports OLS estimates of the (inverse of the) pandemic coverage index on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*. Panel B reports reduced-form estimates of the inverse pandemic coverage index on our instrument, NonFoxHannity_d × FoxShare_d—that is, the number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Columns (5) and (6) in Panel C reports 2SLS estimates of the log of one plus the number of cases on March 14 and the log of one plus the number of deaths on March 28, respectively, on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*, instrumented by NonFoxHannity_d × FoxShare_d. Base OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, and the log of the county's total population. Base controls for the reduced form and the two-stage least squares are identical, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Main controls for both OLS and IV include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Standard errors are clustered at the DMA level. Robust standard errors are reported.

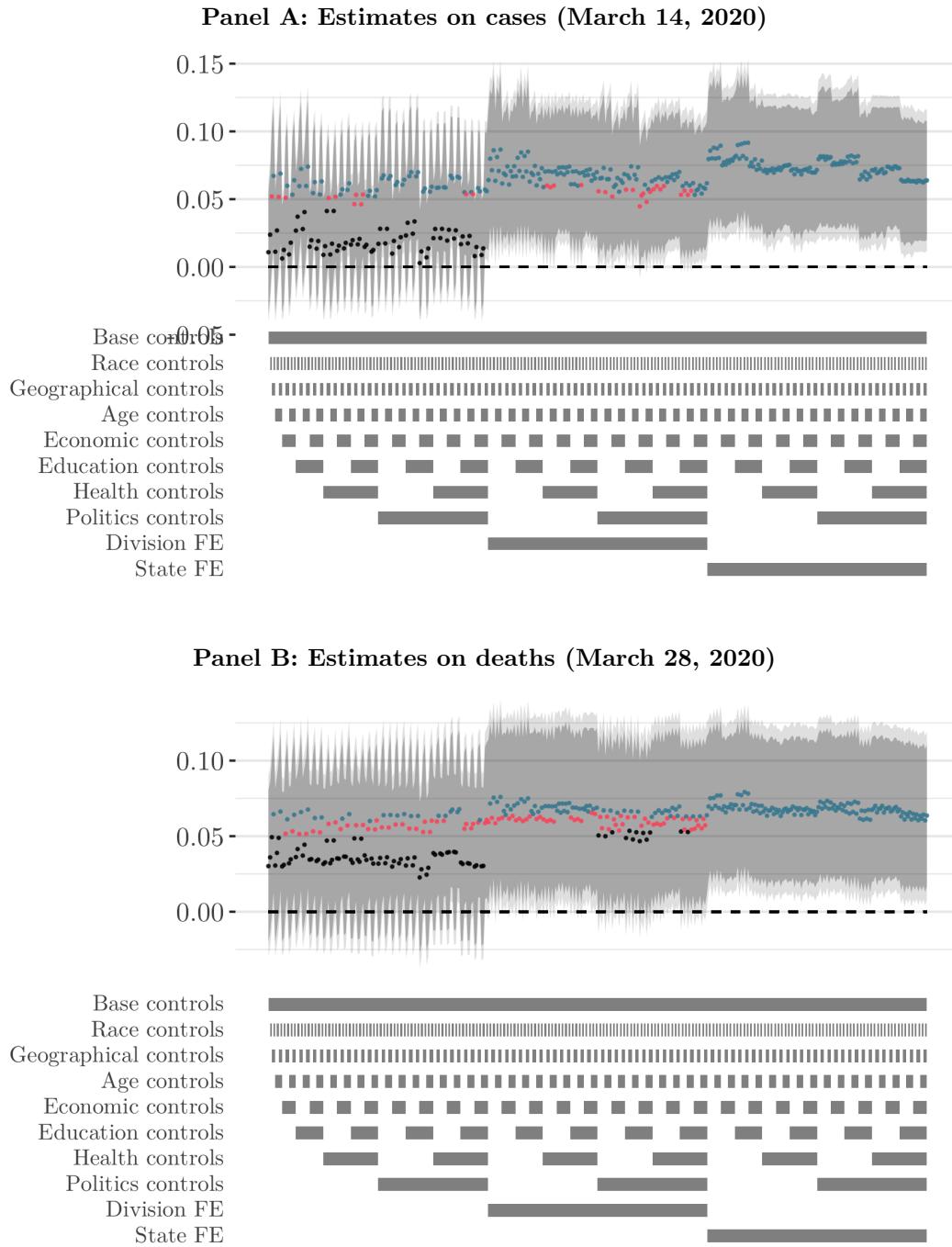
C Robustness Check: Inverse Hyperbolic Sine Transformation

Figure C1: OLS estimates of effect of differential viewership on cases and deaths



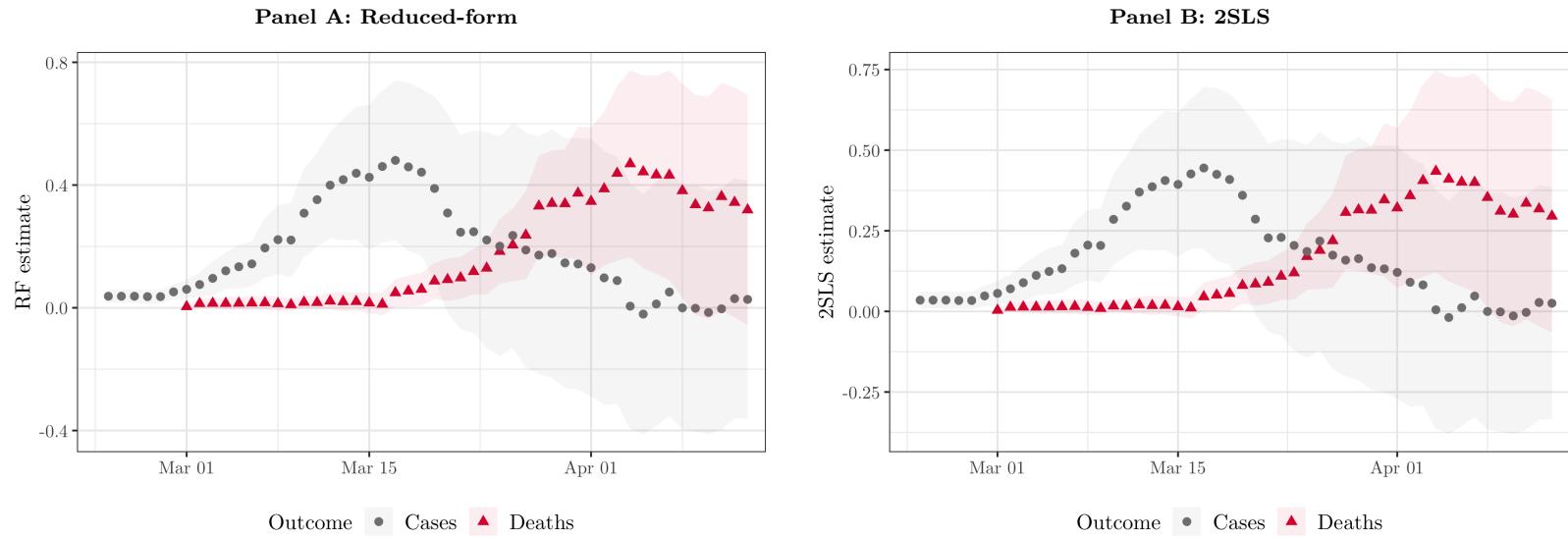
Notes: Figure C1 displays effects of differential viewership of *Hannity* and *Tucker Carlson Tonight* on the inverse hyperbolic sine of cases and the inverse hyperbolic sine of deaths. We report day-by-day results for the correlation between deaths and cases with the standardized difference in viewership of *Hannity* and *Tucker Carlson Tonight*. All regressions are conditional on state fixed effects and a large set of controls: the November 2018 and January 2020 market share of Fox News, the November 2018 market share of MSNBC, log total population, population density, the number of TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, g unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. We cluster standard errors at the DMA level and report 95% confidence intervals.

Figure C2: OLS: robustness to combinations of controls



Notes: Figure C2 shows robustness of our OLS estimates for the specifications for cases on March 14 (Panel A) and deaths on March 28 (Panel B) under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level and report 90% and 95% confidence intervals for each model. Blue points are significant at the 5% level; red points are significant at the 10% level; black points are not significant at the 10% level.

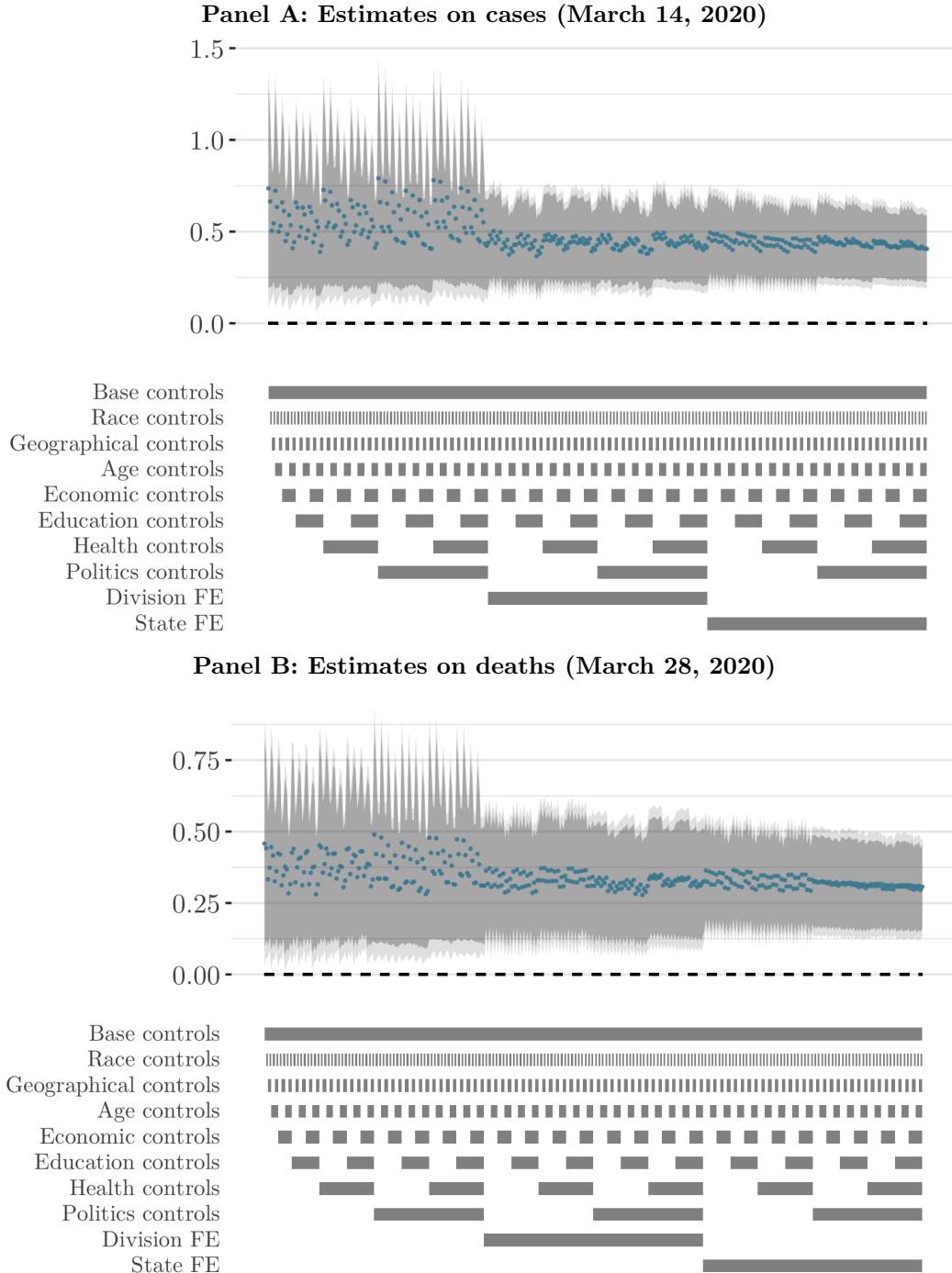
Figure C3: Reduced-form and 2SLS estimates of effect of differential viewership on cases and deaths



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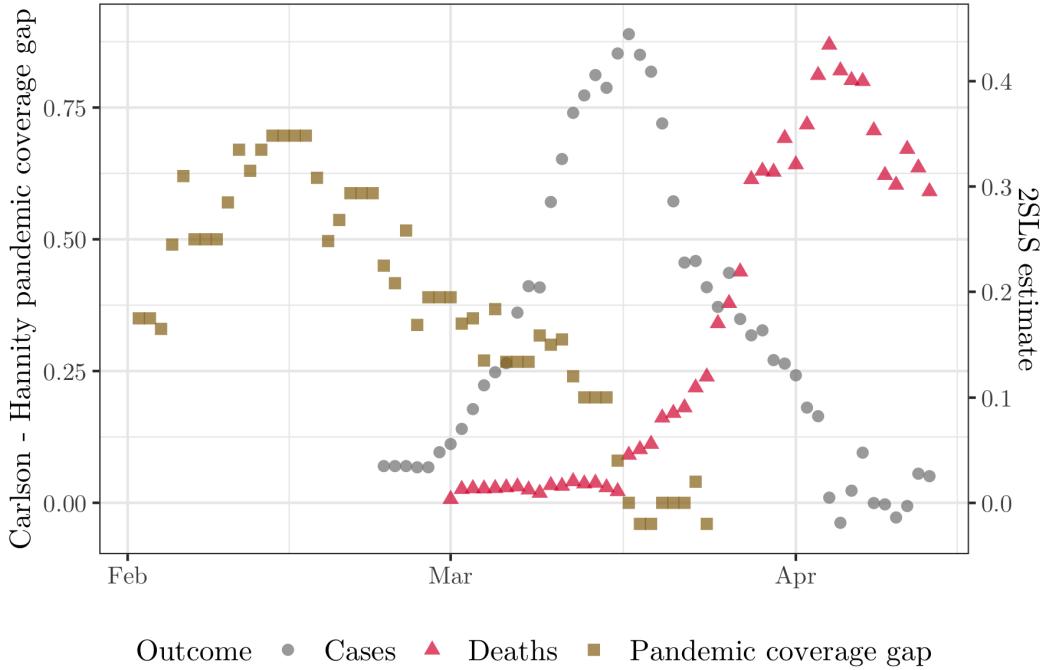
Notes: Figure C3 shows day-by-day reduced form (Panel A) and 2SLS (Panel B) estimates for the inverse hyperbolic sine of cases and the inverse hyperbolic sine of deaths. In Panel A, we report day-by-day effects of our instrument, $\text{NonFoxHannity}_d \times \text{FoxShare}_d$, on deaths and cases conditional on state fixed effects and a large set of controls: Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the number of predicted TVs turned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. In Panel B, we report day-by-day effects of the standardized difference in viewership of *Hannity* vs. *Tucker Carlson Tonight*, instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$ and controlling for state fixed effects and the same set of covariates as in Panel A. We cluster standard errors at the DMA level and report 95% confidence intervals.

Figure C4: 2SLS: robustness to combinations of controls



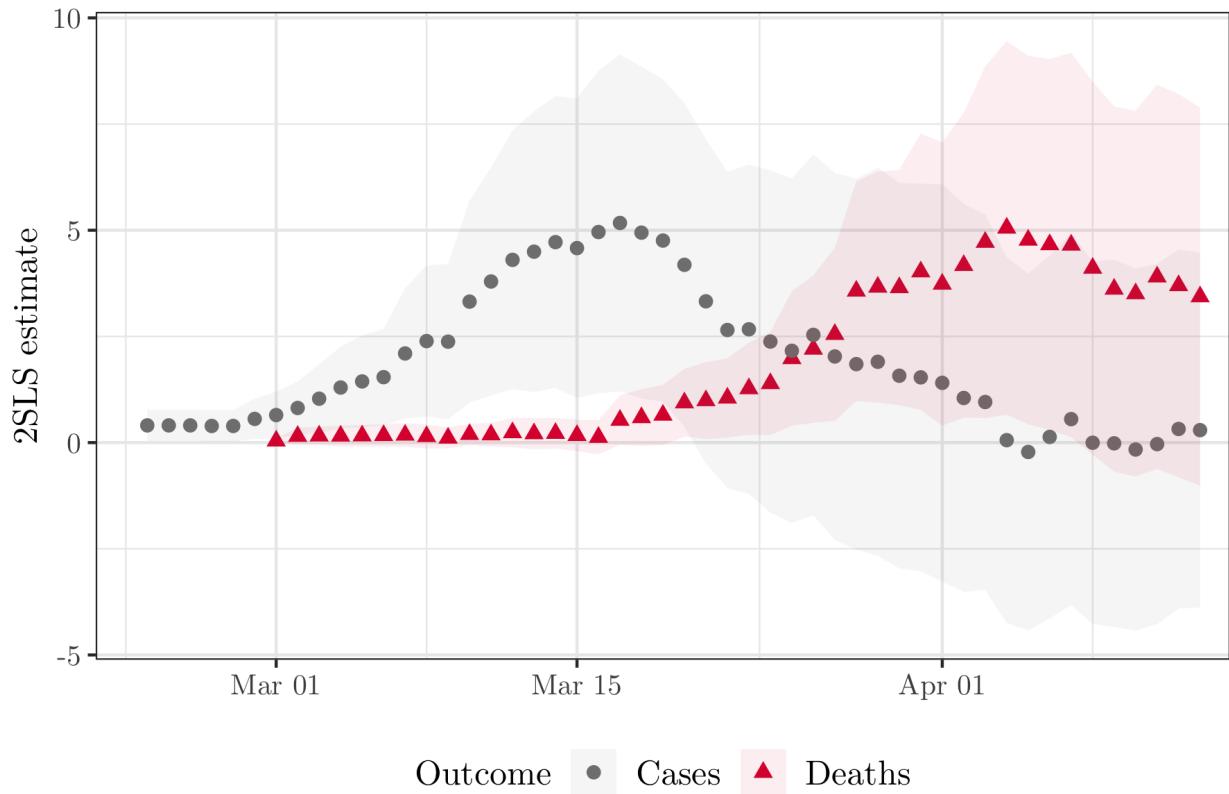
Notes: Figure C4 shows robustness of our two-stage least squares estimates for the specifications for the inverse hyperbolic sine of cases on March 14 (Panel A) and the inverse hyperbolic sine of deaths on March 28 (Panel B) under every possible combination of our seven sets of county-level controls (race, geography, age, economic, education, health, politics) and our three levels of fixed effects (no fixed effects, census division fixed effects, and state fixed effects). We cluster standard errors at the DMA level and report 90% and 95% confidence intervals for each model. Blue points are significant at the 5% level; red points are significant at the 10% level; black points are not significant at the 10% level.

Figure C5: Carlson-Hannity pandemic coverage gap and effects on cases and deaths



Notes: Figure C5 shows, in brown squares corresponding to the left y -axis, the difference in portrayed seriousness of the coronavirus threat on *Tucker Carlson Tonight* vs. *Hannity*, as rated by Amazon Mechanical Turk coders. The difference peaks in mid-February, a period during which there was no discussion of the coronavirus on *Hannity* and during which *Tucker Carlson Tonight* discussed the coronavirus virtually every show. The figure also shows, in gray circles and red triangles corresponding to the right y -axis, 2SLS estimates of the Hannity-Carlson viewership gap (instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$) on the inverse hyperbolic sine of cases and the inverse hyperbolic sine of deaths. All specifications control for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016.

Figure C6: 2SLS estimates of effect of the pandemic coverage index on cases and deaths



Notes: Figure C6 shows day-by-day 2SLS estimates for the inverse hyperbolic sine of cases and the inverse hyperbolic sine of deaths on the inverse of the coverage index described in Section 6. The figure reports estimates from 2SLS regressions of each outcome on the coverage index, instrumented by $\text{NonFoxHannity}_d \times \text{FoxShare}_d$, controlling for state fixed effects, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, the predicted number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, the population-weighted latitude and longitude, the percent in the county living in rural areas, the log of the distance to Seattle, the percent white, Hispanic, and black, the percent over the age of sixty-five, the share of men and women lacking high school degrees, the share of men and women lacking college degrees, the fraction of the population lacking health insurance, the average number of days with self-reported poor physical health over the last 30 days at the county level, the percent under the federal poverty line, log median household income, the unemployment rate, the 2016 Republican vote share, and the log total number of votes cast in 2016. We cluster standard errors at the DMA level and report 95% confidence intervals.

Table C1: Effect of differential viewership on cases

	<i>Dependent variable:</i>							
	COVID-19 cases							
	Feb 22 (1)	Feb 29 (2)	Mar 07 (3)	Mar 14 (4)	Mar 21 (5)	Mar 28 (6)	Apr 04 (7)	Apr 11 (8)
Panel A: Ordinary least squares								
Hannity-Carlson viewership difference	0.003 (0.002)	0.006** (0.003)	0.022* (0.012)	0.064** (0.026)	0.137*** (0.046)	0.117** (0.050)	0.103* (0.054)	0.078 (0.053)
Panel B: Reduced form								
Non-Fox TVs on \times Fox share	0.038*** (0.011)	0.052*** (0.013)	0.195*** (0.050)	0.438*** (0.111)	0.309* (0.165)	0.172 (0.197)	0.005 (0.204)	-0.003 (0.201)
Panel C: Two-stage least squares								
H-C viewership difference (predicted)	0.035*** (0.013)	0.048*** (0.016)	0.180*** (0.050)	0.406*** (0.110)	0.286* (0.151)	0.159 (0.184)	0.005 (0.189)	-0.003 (0.186)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of 1 plus the cumulative number of COVID-19 cases in the county as of the date referenced in the column. Panel A reports OLS estimates of the inverse hyperbolic sine of cases upon standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the inverse hyperbolic sine of cases upon the instrument, $\widehat{\text{NonFoxHannity}_d \times \text{FoxShare}_d}$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the inverse hyperbolic sine of cases upon the standardized difference in Hannity-Carlson viewership, instrumented by $\widehat{\text{NonFoxHannity}_d \times \text{FoxShare}_d}$. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Table C2: Effect of differential viewership on deaths

	<i>Dependent variable:</i>						
	COVID-19 deaths						
	Feb 29 (1)	Mar 07 (2)	Mar 14 (3)	Mar 21 (4)	Mar 28 (5)	Apr 04 (6)	Apr 11 (7)
Panel A: Ordinary least squares							
Hannity-Carlson viewership difference	0.001 (0.001)	0.003 (0.003)	0.001 (0.004)	0.022** (0.011)	0.064** (0.028)	0.098** (0.041)	0.129*** (0.049)
Panel B: Reduced form							
Non-Fox TVs on \times Fox share	0.004* (0.002)	0.017 (0.011)	0.020 (0.015)	0.092*** (0.035)	0.332*** (0.083)	0.469*** (0.156)	0.363* (0.190)
Panel C: Two-stage least squares							
H-C viewership difference (predicted)	0.003 (0.002)	0.015 (0.011)	0.019 (0.014)	0.085** (0.034)	0.307*** (0.089)	0.434*** (0.160)	0.336* (0.184)
Full controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102	3,102

Notes: The dependent variable is the log of 1 plus the cumulative number of COVID-19 deaths in the county as of the date referenced in the column. Panel A reports OLS estimates of the inverse hyperbolic sine of deaths upon standardized difference in Hannity-Carlson viewership. Panel B reports reduced-form estimates of the inverse hyperbolic sine of deaths upon the instrument, $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$ — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Panel C reports two-stage least squares estimates of the inverse hyperbolic sine of deaths upon the standardized difference in Hannity-Carlson viewership, instrumented by $\widehat{\text{NonFoxHannity}_d} \times \text{FoxShare}_d$. OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, the log of the county's total population, MSNBC's share of cable in January 2018, population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. IV controls are identical to OLS controls, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Standard errors are clustered at the DMA level. Robust standard errors are reported.

Table C3: Differential coverage and COVID-19 outcomes across all Fox News evening shows

	Dependent variable:					
	Inverse pandemic coverage index				Cases	Deaths
	(1)	(2)	(3)	(4)	Mar 14	Mar 28
Panel A: OLS: inverse pandemic coverage index on relative viewership						
H-C viewership difference	0.129*** (0.008)	0.129*** (0.008)				
Panel B: RF: inverse pandemic coverage index on instrument						
NonFoxHannity _d × FoxShare _d		0.089*** (0.031)	0.093*** (0.031)			
Panel C: 2SLS: cases and deaths on inverse predicted pandemic coverage index						
–1 × coverage index (predicted)				4.720*** (1.752)	3.569*** (1.321)	
Base controls	Yes	Yes	Yes	Yes	Yes	Yes
Main controls	No	Yes	No	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,102	3,102	3,102	3,102	3,102	3,102

Notes: Panel A reports OLS estimates of the (inverse of the) pandemic coverage index on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*. Panel B reports reduced-form estimates of the inverse pandemic coverage index on our instrument, NonFoxHannity_d × FoxShare_d — that is, the predicted number of TVs on during Hannity's timeslot, excluding TVs watching *Hannity*, multiplied by Fox News' viewership share, excluding *Hannity* and *Tucker Carlson Tonight*. Columns (5) and (6) in Panel C reports 2SLS estimates of the inverse hyperbolic sine of the number of cases on March 14 and the inverse hyperbolic sine of the number of deaths on March 28, respectively, on the standardized difference between viewership of *Hannity* and *Tucker Carlson Tonight*, instrumented by NonFoxHannity_d × FoxShare_d. Base OLS controls include the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle*, Fox News' and MSNBC's share of cable in January 2018, Fox News' share of television in January 2020, the population density of the county, and the log of the county's total population. Base controls for the reduced form and the two-stage least squares are identical, except the number of TVs tuned to non-Fox channels during *Hannity*, *Tucker Carlson Tonight*, and *The Ingraham Angle* are replaced with the predicted number of TVs tuned to non-Fox channels during these timeslots. Main controls for both OLS and IV include population-weighted latitude and longitude, log distance to Seattle, the percent of the population living in a rural area, the population over the age of 65, the percent male with no high school degree, the percent female with no high school degree, the percent male with no college degree, the percent female with no college degree, an age-adjusted measure of the average physical health in the county, the percent uninsured, the percent below the federal poverty line, the log of the median household income, the unemployment rate, the Republican vote share in 2016, and the log of the total number of votes in the county in 2016. Standard errors are clustered at the DMA level. Robust standard errors are reported.

D Survey Instrument

D.1 Consent and demographics questions

Please review the following consent form before proceeding with this survey.

Consent for Participation in a Research Study

DESCRIPTION: We are researchers at the University of Warwick studying how the news media portrays the coronavirus. Participation should take about 10 minutes.

RISKS and BENEFITS: The risks to your participation in this online study are those associated with basic surveys including boredom, fatigue, mild stress, or breach of confidentiality. The benefit to you is the learning experience from participating in a research study. The benefit to society is the contribution to scientific knowledge. The University of Warwick will only use this data for research purposes.

SUBJECT'S RIGHTS: Your participation is voluntary. You may stop participating at any time by closing the browser window.

For additional questions about this research, you may contact:

- Christopher Roth at
Christopher.Roth@warwick.ac.uk

Please indicate, in the box below, that you are at least 18 years old, have read and understand this consent form, and you agree to participate in this online research study.

I agree to participate in the research

I do not agree to participate in the research



What is your exact age?

What is your gender?

Male

Female

With which political party do you identify?

Democratic Party

Republican Party

Independent

Do you have a job outside of taking surveys?

- Yes: full-time (35+ hours a week)
- Yes: part-time (less than 35 hours a week)
- No: homemaker
- No: currently seeking employment
- No: student
- No: retired
- No: other

What was your family's gross household income in 2019 in US dollars?

- Less than \$15,000
- \$15,000 to \$24,999
- \$25,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$200,000
- More than \$200,000

Which of the following best describes your race or ethnicity?

- African American/Black
- Asian/Asian American
- Caucasian/White
- Native American, Inuit or Aleut
- Native Hawaiian/Pacific Islander
- Other

Are you of Hispanic, Latino, or Spanish origin?

- Yes
- No

What is the highest level of education you have completed or the highest degree you have received?

- Less than high school degree
- High school graduate (high school diploma or equivalent including GED)
- Some college but no degree
- Associate degree in college (2-year)
- Bachelor's degree in college (4-year)
- Master's degree
- Doctoral degree
- Professional degree (JD, MD)



D.2 Media consumption questions

Which, if any, of the following major TV news stations do you watch at least once a week?

CNN

MSNBC

Fox News

Other



D.2.1 Fox News

You indicated that you watch Fox News at least once a week. How often do you watch each of the following shows on Fox News?

	Never	Occasionally	Every day or most days
Sean Hannity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Ingraham Angle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Fox show	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Five	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Story with Martha MacCallum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tucker Carlson	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



D.2.2 CNN News

You indicated that you watch CNN at least once a week. How often do you watch each of the following shows on CNN?

	Never	Occasionally	Every day or most days
Anderson Cooper 360	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Erin Burnett OutFront	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
CNN Tonight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cuomo Prime Time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other CNN show	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Situation Room	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



D.2.3 MSNBC News

You indicated that you watch MSNBC at least once a week. How often do you watch each of the following shows on MSNBC?

	Never	Occasionally	Every day or most days
The Beat with Ari Melber	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other MSNBC show	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All In with Chris Hayes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Last Word with Lawrence O'Donnell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The 11th Hour with Brian Williams	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Rachel Maddow Show	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



D.3 Behavior change questions

Did you change any of your behaviors (for example: cancelling travel plans, washing hands or disinfecting significantly more than often, staying six feet away from others, asking to work from home, etc.) in response to the coronavirus over the last few weeks?

Yes

No



When did you first significantly change any of your behaviors (For example, cancelling travel plans, washing hands or disinfecting significantly more than often, staying six feet away from others, asking to work from home, etc.) in response to the coronavirus? How did you change your behavior? Why did you change your behavior?

On which date, did you first significantly change any of your behaviors in response to the coronavirus? (For example, cancelling travel plans, washing hands or disinfecting significantly more than often, staying six feet away from others, asking to work from home, etc.).

	Month	Day
Date of change in behavior	<input style="width: 100%; height: 25px;" type="text"/>	<input style="width: 100%; height: 25px;" type="text"/>



D.4 Post-outcome questions

What is your zipcode of residence?



Thank you very much participating in this survey. If you have any comments, please let us know below.

