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Reflective Essay

My research process began in Spring 2021 when I first applied to the Economics Honors Thesis Program. My initial research topic was to explore how misinformation in news outlets decreased market efficiency by influencing individuals to make decisions based on unreliable information. In early October, I set up a research consultation with the Research & Engagement Librarian, Angela Chikowero. She supported me in narrowing down my topic and finding reliable sources through the library. Through this consultation and meetings with my Econ 196A-B professor, Professor Lundberg, and my thesis advisor, Professor Birchenall, I developed and narrowed my topic to focus on exploring the early unprecedented avoidance behavior due to the Coronavirus in March 2020.

My next step was to find a reliable measurement of "avoidance behavior" relevant to and affected by the Coronavirus. Angela, the Economics Research Librarian, assisted me in researching potential databases that track daily data such as Statista. She also helped me search for data sources used by other published papers about Covid-19 and the dining industry. After cross referencing and researching the available databases, we chose to use OpenTable's database on daily seated dining rates at restaurants as compared to pre-pandemic levels from February to March 2020.

When it came to finding data sources for my independent variables, I started by reviewing the list of reliable data sources that Angela provided in my Econ 196A course. From this list, I chose to use a selection of city and county level demographics provided by the US Census Bureau. Angela also taught me how to use the keyword search strategy to find relevant Economic papers on the UC Library Search. By using keywords such as "Covid-19", "restaurant industry", and "dining", I was able to access published papers related to my topic, mostly from Elsevier. Not only did this provide me with a foundation to narrow my topic further, but it also helped me use the cross-referencing technique to find credible sources for my paper such as election voting data and daily Covid-19 cases. The main criteria I applied when choosing sources was credibility. Thus, my dataset consisted entirely of government sources and sources used in papers published in reputable journals like Elsevier.

Through writing my thesis, I learned how reliable sources are essential to drawing reliable conclusions in research. I found that different sources and regressions led to different narratives and findings. I utilized critical thinking to determine neutral and practical methods for organizing my data, running regressions, and interpreting the findings. I also learned that these findings do not occur in a vacuum, but instead are directly guided by the sources. Thus, I realized the importance of critically evaluating my sources to draw objective conclusions. When assessing sources, I read the notes and disclaimers that were provided and disclosed any shortcomings of the data in my paper. Lastly, I recently worked with Angela through multiple consultations to review the MLA 8th edition format and apply it appropriately to my paper.

In the end, although I did not pursue my original topic of how misinformation in the media affects individuals' decisions in my paper, this year-long process has taught me tangible lessons to apply to my own life as a daily consumer of information from sources everywhere. It also taught me that research is not a straightforward process, but instead an iterative one. Through my library research consultations with Angela, meetings with my professors, and the effective use of all the library resources available to me, I learned how to think more critically, dig deeper, and, most importantly, that results are only as reliable as their sources.

Political Ideology and Early Restaurant Avoidance during Covid-19

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ABSTRACT

This paper studies whether political ideology affected early restaurant avoidance behavior during Covid-19 in March 2020. Early conflicting narratives about the severity of Covid-19 driven by political leaders and media outlets with liberal versus conservative views may impact the speed in which Republican and Democratic cities adopt safety measures such as avoiding dining at restaurants. I use data on seated dining rates at restaurants from OpenTable and find that cities in the United States with more Democratic voters saw faster declines in seated dining. I also find that cities with more Covid-19 cases saw faster declines in seated dining rates, but this effect is concentrated on early adopter cities. These findings have public health implications which suggest that effective public health policy should take the influence of politics on behavior into account.

1. Introduction

Covid-19 is an unprecedented global event with significant and long-term effects on health, social behavior, and the economy. This research seeks to study how political ideology influenced consumer avoidance behavior for going out to public places during the early stages of Covid-19. Using data on daily seated dining rates at restaurants provided by OpenTable, this paper studies changes in avoidance behavior across various cities within the United States in March 2020 due to differences in political ideology and Covid-19 cases.

While some may correlate avoidance behaviors with the number of Covid-19 cases in a city, many cities saw declines in seated-dining prior to high case or death counts. If the direct presence of Covid-19 cases was not the only cause of individuals deciding to stay home rather than eat out in March 2020, what else could have influenced this change in behavior? This research focuses primarily on the influence that political ideology had on the decline in seated dining rates. Articles referenced later in this study illustrate early conflicting messaging regarding the severity of Covid-19 from public health experts, media outlets, and along partisan lines. Surveys taken in March 2020, focusing on American views of Covid-19, based on political affiliation, also showed a clear distinction between self-reported Democratic and Republican views on the risk of Covid-19. This empirical research uses OLS regressions to study the epidemiological and political determinants of avoidance behavior. The primary regression measures the number of days it took each city to reach a 50% decline in seated dining based on the city's voting gap in the 2020 presidential election and the cumulative Covid-19 cases in each city.

I use data on seated dining rates at restaurants from OpenTable to show that cities in the United States with more Democratic voters saw faster declines in seated dining rates, controlling

for local Covid-19 cases, population density, the share of population 60+ years old, and restaurant density. I also find evidence that cities with more Covid-19 cases saw faster declines in dining, but this result was highly concentrated around three early adopter cities. When these three are excluded from the regression, Covid-19 cases are no longer a statistically significant variable in explaining why some cities declined faster than others.

The coronavirus pandemic in the United States is an indicator that public health policy should take politics into account to be effective. The influence that political ideology and polarization had on American behavior limited the ability of public health experts to efficiently execute public health policies to combat the pandemic. A recent study found "that the impact of political ideology on health behaviors in times of crisis is abundant and significant" and that "ideological partisanship/political ideology should be a required variable in any study looking at health-related attitudes, beliefs, and behaviors" (Geana et al., 2021). The speed in which Americans adopted safety measures such as avoiding dining at restaurants at the start of the pandemic was significantly influenced by their political ideology. Initial Republican messaging, primarily voiced by President Donald Trump, downplayed the severity of Covid-19. The results of our study show that cities with more Republican voters in the 2020 presidential election adopted Covid-19 safety responses, specifically avoiding dining at restaurants, slower than cities with more Democratic voters. Accordingly, it would be beneficial for public health experts to develop a strategy to implement effective policies during health emergencies in the face of political polarization and its influence on American behavior.

2. Literature Review

Conflicting Covid-19 Narratives

March 2020 was a period of great uncertainty about the coronavirus with conflicting information coming from public health experts, the Democratic and Republican administrations, and media outlets (Bursztyn et al., 2020). At this early stage, there was not enough information on how the virus spreads, its severity, and what safety measures would be most effective. Many Americans looked to political leaders and the media outlets to determine how to respond to the coronavirus threat. Several media outlets reported that the Trump administration consistently minimized the severity of Covid-19 in the early months of the pandemic (The Associated Press, 2020). President Donald Trump even admitted to downplaying the risk in private interviews with journalist, Bob Woodward, which were released in September 2020. In his March 19, 2020 interview, President Donald Trump said, "I always wanted to play it down. I still like playing it down because I don't want to create a panic" (Keith, 2020). In contrast to this relaxed narrative, the liberal sided media spread messaging that coronavirus was a major threat. Further, a study published by the National Bureau of Economic Research in March 2021 found that 91% of stories by U.S. major media outlets are negative in the tone of their Covid-19 reporting since January 1, 2020, versus 54% for non-U.S. major sources and 65% for scientific journals (Sacerdote et al., 2020). Table 1 provides relevant examples of the conflicting messaging around the severity of Covid-19 in its early stages that may have influenced American restaurant avoidance behavior.

Table 1

Examples of conflicting information about coronavirus from public health experts, the Democratic and Republican administrations, and media outlets.

January 22	"We have it totally under control. It's one person coming in from China. We have it under control. It's going to be just fine."[1]	President Donald Trump
January 31	"The deadly new coronavirus is starting to spread in the US. Here's how to protect yourself"[2]	CNN Article Headline
February 10	"Looks like by April, you know in theory when it gets a little warmer, it miraculously goes away."[3]	President Donald Trump
February 26	"CDC official warns Americans it's not a question of if coronavirus will spread, but when"[4]	CNN Article Headline
March 10	"We're prepared, and we're doing a great job with it. And it will go away. Just stay calm. It will go away."[5]	President Donald Trump
March 11	"The penalties are, you might be killing your granddad if you don't do it, and I'm serious about this."[6]	Washington Governor, Jay Inslee

Note: The specific sources for each quote or headline can be found in the footnotes.

Decline in Seated Dining Rates

OpenTable is a free service that allows users to make restaurant reservations online. A key variable of interest in this research is the daily seated dining rates at restaurants across cities. Figure 1 uses data from OpenTable to show a universal decline in seated dining levels prior to the execution of any restaurant shutdowns or stay-at-home orders. San Francisco issued the first stay-at-home order in the country on March 16, 2020, and the flat line at -100% in the weeks of March 18 through March 31 is due to the implementation of shutdown policies by the government. The figure also shows that even cities with low Covid-19 cases and no state

[1] In an interview from the World Economic Forum in Davos, Switzerland, President Donald Trump says, "we have it totally under control", following the CDC's announcement of the first confirmed coronavirus case in the United States (Wef, 2020).
[2] This CNN article reports on the early coronavirus cases in the United States and other coronavirus updates (Yan, 2020).
[3] President Donald Trump addresses coronavirus to his supporters at a rally in Manchester, New Hampshire on February 10, 2020 (Crawford, 2020).
[4] This CNN article reports on the telebriefing by Dr. Nancy Messonnier, director of the CDC's National Center for Immunization and Respiratory Diseases, on February 26, 2020 (McLaughlin, 2020).
[5] President Donald Trump speaks to reporters about his administration's coronavirus response after a meeting with lawmakers (The Associated Press, 2020).
[6] Washington Governor, Jay Inslee, responds to MSNBC News on March 11, 2020, when asked what the penalties are for not abiding by the Washington ban on any gathering of more than 250 people (Inslee, 2020).

announcements of emergency see a sharp decline in seated dining prior to the federal announcement of emergency on March 13, 2020.

Figure 1

Decline in seated dining rates at OpenTable restaurants across the 37 cities in the sample from February 18th, 2020 to March 31st, 2020.

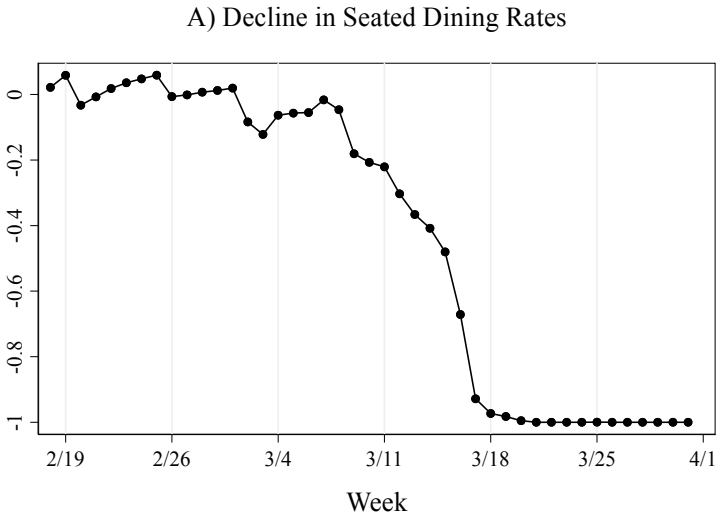

Fig. 1. Decline in Seated Dining Rates. Note: Panel A shows OpenTable's city-level data on daily seated dining rates relative to each city's 2019, pre-pandemic, levels. The data starts on February 18, 2020 and continues to be updated to the current date. The seated diners come from a sample of approximately 20,000 restaurants on OpenTable in cities with more than 50 restaurants listed on OpenTable (OpenTable, 2020).

Timeline of Key Events

The magnitude and speed of the decline in seated dining rates across the country was unprecedented. To better understand the context that individuals were facing when making the decision to rapidly change their regular behavior, Table 2 displays a timeline of key events regarding coronavirus in the United States.

Table 2

Timeline of key events relevant to Covid-19 from January 20, 2020 to March 31, 2020.

January 20	The CDC confirmed the first U.S. Covid-19 case from a sample "taken on January 18 in Washington state", nearby Seattle.[1]
January 20	The CDC announces that U.S. airports will start screening for Covid-19.[1]
January 29	"The White House Coronavirus Task Force is established"[1]
January 31	The Task Force "declares the SARS-SoV-2 virus a public health emergency" and announces new travel policies effective February 2, 2020.[1]
January 31	The World Health Organization declared the Covid-19 "outbreak a Public Health Emergency of International Concern."[1]
February 3	The U.S. "declares a public health emergency."[2]
February 11	"The World Health Organization announces the official name for the disease" as COVID-19.[1]
February 29	Washington is the first state to announce an emergency.[3]
March 9	White House officials announced that the U.S. will test one million people this week, but only completed 4,000 tests.[4]
March 11	The World Health Organization declares COVID-19 a pandemic due to its alarming spread and severity.[2]
March 13	President Donald Trump declares that Covid-19 is a nationwide emergency.[2]
March 13	The Trump administration's "travel ban on non-U.S. citizens traveling from Europe goes into effect."[2]
March 15	"The CDC warns against holding or attending gatherings larger than 50 people."[5]
March 15	New York City's public school system, the largest in the U.S., shuts down.[2]
March 16	Ohio closes its restaurants and bars.[2]
March 17	Covid-19 is present in all 50 states now that West Virginia reported its first case.[5]
March 17	The first stay-at-home order in the country goes into effect in San Francisco.[5]
March 19	California is the first state to issue a statewide stay-at-home order.[2]
March 26	The United States becomes the country with the most confirmed coronavirus cases, "topping 82,000".[5]
March 31	Dr. Fauci and Dr. Brix announce that 100k–240k deaths are expected in the U.S. "even if social distancing and public health measures are perfectly enacted".[1]

Note: The specific sources for each quote or event are as follows: [1] (CDC, 2022), [2] (AJMC Staff, 2021), [3] (The Council of State Governments, 2020), [4] (Doggett, 2022), [5] (Schumaker, 2020).

Partisan Differences in Social Distancing

There are several economic studies that discuss various aspects of the Covid-19 pandemic. The existing research on this topic includes the effects of shutdowns on the restaurant industry, the effects of restrictions or lifting restrictions on dining behavior and preferences, the effects of dining on rising Covid-19 cases and deaths, and the effects of partisan differences on social distancing.

One study evaluated how partisan differences influenced American responses to Covid-19, specifically social distancing, from the period of January 27, 2020 to July 12, 2020. The study used "location data from a large sample of smartphones to show that areas with more Republicans engaged in less social distancing" (Allcott et al., 2020). The GPS evidence displayed significant partisan gaps in the social distancing behaviors of individuals. These results controlled for factors such as public policies, Covid-19 cases and deaths, and population density. The study also conducted a survey and found "significant gaps…between Republicans and Democrats in self-reported social distancing, beliefs about personal COVID risk, and beliefs about the future severity of the pandemic" (Allcott et al., 2020).

Despite the existing research on Covid-19 and dining, there are still many gaps to explore. There has not been substantial research on consumer avoidance behavior prior to the state-mandated stay-at-home orders and restaurant closures. Further, no published articles have studied the effects of political ideology on seated dining behavior specifically from the period of February to March 2020.

3. Empirical Strategy

My two hypotheses are: (1) Seated dining rates will decline faster in cities with larger voting gaps than cities with smaller voting gaps (2) Seated dining rates will decline faster in cities with higher Covid-19 cases than cities with lower Covid-19 cases. Results that support (1) would show a faster decline in dining rates in more Democratic cities than in cities with more relative Republicans. Results that support (2) would show a larger decline in dining rates in cities with more Covid-19 cases than cities with less Covid-19 cases. The opposite results or statistically insignificant results would both disprove my hypotheses.

In the lens of uncertainty, higher cases in a city increases the risk of getting sick, which may lead people to change their behavior and avoid dining at restaurants. Individuals balance the decision of going out to dinner with the perceived risk, or fear, of getting Covid-19 and the satisfaction of going out to a restaurant. As the probability of getting sick increases with more Covid-19 cases in a city, or the perceived future risk increases, individuals will change their behavior, in theory, to maximize their expected utility. Thus, I expect seated dining rates to decline faster in cities with higher Covid-19 cases.

Beyond cases, the conflicting narratives surrounding Covid-19 by political leaders and media outlets may have also influenced individuals' perceived risks of Covid-19. Figure 2 reflects American views during March 2020 on relevant aspects of Covid-19, based on political affiliation.

Figure 2

Republican versus Democrat views on the risk of Covid-19, the adoption of safety measures, and trust in various sources of Covid-19 information from surveys taken in March 2020.

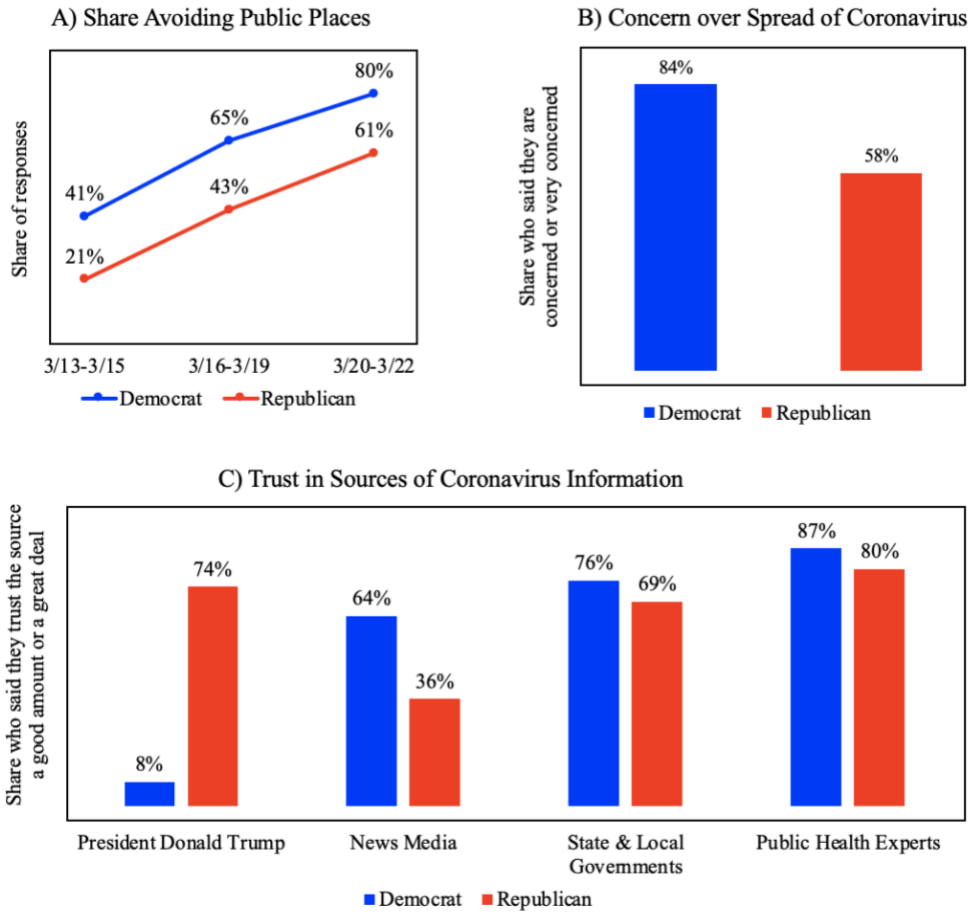

Fig. 2. Survey on Covid-19 Views. Note: Panel A shows the share of Americans reporting they are avoiding public places, such as stores and restaurants (Saad, 2020). Panel B shows the share of people concerned or very concerned about coronavirus spreading to their community as of March 13-14 (Marist, 2020). Panel C shows the share of people who trust the information they hear about coronavirus from various sources a good amount or a great deal as of March 13-14 (Marist, 2020).

Panel A shows that Democrats self-reported to avoid public places like restaurants, 20% more than Republicans. Panel B shows that over 20% more Democrats were concerned about the spread of coronavirus to their area, which shows that they view coronavirus has a bigger risk, which is in line with the narrative they have received. Lastly, Panel C makes clear that there is a major distinction in the trust of coronavirus information coming from President Donald Trump.

Most Republicans in the survey trusted in his low-risk Covid-19 narrative, while only 8% of Democrats trusted him. Since President Trump was one of the most prominent voices saying that Covid-19 wasn't a threat and advocating people to remain calm, it is reasonable to expect that Republicans would behave accordingly by not reducing their dining as much or as fast as Democrats did.

This research focuses primarily on the effect that political ideology had on the decline in seated dining rates at restaurants across major cities in the United States in March 2020. To test my hypotheses, I rely on the OLS regression:

$$D_i = \beta_0 + \beta_1 G_i + \beta_2 C_i + \beta_3 X_i + \varepsilon_i$$

D_i measures the number of days it took each city to reach a 50% decline in seated dining, where i is the index for each city. G_i measures the city's voting gap in the 2020 presidential election. C_i measures the cumulative Covid-19 cases in each city by March 20, 2020. X_i controls for each city's population density, share of population 60+ years old, and restaurant density, to avoid omitted variable bias. From this baseline, I run regressions that exclude three early adopter cities and use a robust standard error. The primary dependent variable of focus is the number of days it took each city to reach a 50% decline in seated dining rates because this measure has the most variability across cities and is uninfluenced by government mandates such as restaurant closures and stay-at-home orders. Additionally, all 37 cities in the dataset declined to -100% by March 21, 2020, thus -50% measures the half-life of each city. The accompanying dependent variables in the regressions represent the number of days it took each city to first hit -75% and -95% in seated dining rates.

4. Data

The key variables in my empirical strategy include seated dining rates, cumulative Covid-19 cases, and the Biden-Trump voting gap in the 2020 presidential election. I have also compiled data on characteristics such as the population density, share of the population 60+ years old, and restaurant density to control for relevant differences across cities.

The dependent variable, seated dining rates, comes from OpenTable data tracking seated dining rates across various metropolitan cities from February 18, 2020, to the current date. The daily data represents how many people dined in restaurants in 2020, as compared to pre-pandemic levels in 2019, as a percentage. Since cities are compared relative to themselves a year earlier, this reduces fixed differences across cities such as climate, region, etc. The seated diners come from a sample of approximately 20,000 restaurants on OpenTable in cities with more than 50 restaurants listed on OpenTable. The data does not account for changes in the number of restaurants listed on OpenTable, however, the impacts of restaurant closures due to Covid-19 is not as relevant in the time frame of February – March 2020. To provide year-over-year comparisons, the data compares the same day of the week in 2020 to the same day of the week in 2019, rather than the same date. This minimizes issues of comparing a day in the middle of the week with a day that was on the weekend in the previous year (OpenTable, 2020). Ideally, I would have liked to use data starting from January 2020 to March 2020 rather than starting on February 18th, 2020. Also, the data is occasionally volatile in its day-to-day comparisons, however, its overall trend is reliable. The data includes dining rates from all 37 metropolitan cities in the United States that OpenTable provides data for from February - March 2020.

The primary dependent variable in the regressions is the number of days it took each city to first hit -50% in seated dining rates. The underlying variable used is the OpenTable city-level

data on daily seated dining rates relative to each city's 2019, pre-pandemic, levels. Since the dataset begins on February 18, 2020, this day represents day 0. For example, Seattle was the first city to reach -50% in seated dining in 22 days. 22 days equates to March 11, 2020. This measure is used to compare the speed of decline across cities rather than the decline on a specific day. The accompanying dependent variables in the regressions represent the number of days it took each city to first hit -75% and -95% in seated dining rates.

Each state issued an announcement of emergency regarding Covid-19 across a variety of days in March 2020. I have compiled a list of these dates from the executive orders released for each state from the Council of State Governments website (The Council of State Governments, 2020). All 37 cities in the dataset reached -50% in dining after its state announcement of emergency. The first state to announce an emergency was Washington on February 29. The last state to announce an emergency was Georgia on March 14. All other cities in the dataset saw their state release an announcement of emergency prior or the same day as the federal announcement of emergency declared by President Trump on March 13. This announcement affected each city at the same time in contrast to the state announcements which were specific to each state. Most cities in the dataset, except three, reached -50% in dining after the federal announcement of emergency on March 13. Seattle, WA, New York City, NY, and San Francisco, CA, were the only cities that reached -50% in dining prior to the federal announcement. Seattle and New York City were early Covid-19 hotspot cities with the two highest levels of Covid-19 cases in the country. Although San Francisco did not have high Covid-19 cases at the time, Mayor Breed took early action to declare a local state of emergency on February 25 and announced the first stay-at-home order in the country on March 16, which went into effect on March 17, two days prior to its state's stay-at-home order (Breed, 2020). Thus, these three cities

that reached -50% in dining before the federal announcement of emergency were early adopters of the Covid-19 safety measures relative to other major cities in the country who saw greater drops in dining after the federal announcement of emergency was declared.

The primary independent variable in my regressions is the Biden-Trump Voting Gap (%). This data was collected at the county-level from the MIT Election Data and Science Lab (MIT, 2020). One downfall is that the OpenTable data is based on cities rather than counties, while the election data is based on counties. However, county data is still a strong indicator of city data. Although, 36 of the 37 cities in the dataset voted for President Joe Biden in the 2020 presidential election, the voting margin between President Joe Biden and President Donald Trump varied significantly across these cities. A larger voting gap is associated with more Democratic voters in a city, and a smaller voting gap is associated with less Democratic voters in a city. For reference, each county's voting gap in the 2016 presidential election varied from its voting gap in the 2020 presidential election by less than 10%, except for one county, Miami-Dade, FL, which had a 22% decline in its voting gap from 2016 to 2020.

Another key variable is the total number of Covid-19 cases in a city each day. This data comes from the New York Times and has been used in other economic studies about Covid-19 and dining (NY Times, 2020). The data shows the total number of Covid-19 cases reported each day, however, this likely does not portray the actual exact number of Covid-19 cases in a city. The measurement is likely biased downward because it takes, on average, three days for a test result to be reported, there was an initial shortage of Covid-19 tests, and not everyone with Covid-19 gets tested either because they are asymptomatic or choose not to. Within the regressions, I use the cumulative Covid-19 cases in each city by March 20, 2020. This is a good

measure of city's cases relative to each other because every city had reached a 95% decline in seated dining rates by this day.

I use three relevant control variables: population density, share of the population 60+ years old, and restaurant density. The population density (inhabitants/m²) is obtained from the U.S. Census Bureau's County Population by Characteristics: 2010 – 2019 (US Census Bureau, 2019) and the U.S. Census Bureau's 2010 Metropolitan Area and Population data (US Census Bureau, 2010). The population figure used in the calculation is the July 1, 2019 population estimate for each county. The land figure used in the calculation comes from the 2000 metropolitan land area estimates, in square miles. Population density is relevant because more crowded cities may be exposed to more Covid-19 cases, which could increase the risk of going to restaurants relative to less dense cities. The share of the population 60+ years old (%) is also obtained from the U.S. Census Bureau's County Population by Characteristics: 2010 – 2019 (US Census Bureau, 2019). The population used in the calculation comes from the same 2019 estimate used to calculate the population density. This variable is relevant since the risk of getting sick and dying from Covid-19, or most illnesses, increases with age. Thus, cities with older populations may have reason to adopt safety measures such as reducing seated diners at restaurants faster than younger populations. The restaurant density (inhabitants/restaurants) is obtained from the U.S. Census Bureau's 2019 County Business Patterns (US Census Bureau, 2021). The number of restaurants includes all establishments in a county with the NAICS industry code, 722511, for "Full-Service Restaurants". The population used in the calculation of restaurant density is the same 2019 estimate used to calculate the population density. Restaurant density is also relevant because cities with more restaurant options may see slower declines since individuals can spread out across many restaurants rather than being densely packed into a

smaller number. However, none of these controls were statistically significant in determining the various speeds of decline in seated dining across major cities in the United States.

Table 3

Descriptive summary of the key variables used in the regressions.

Variable	Mean	Min	Max
2020 Biden-Trump Voting Gap (%)	0.32	-0.25	0.84
Cumulative Covid-19 Cases on 3/20/20	217	7	4,419
Share 60+ Years (%)	0.20	0.15	0.40
Population Density (inhabitants/m²)	574	87	2,472
Restaurant Density (inhabitants/restaurant)	1,322	166	6,547
# Days to 50% Decline	26.2	22	28
# Days to 75% Decline	27.7	27	29
# Days to 95% Decline	28.6	27	31

Note: This table reports key variable statistics, and the sources of each variable are explained in the text.

Each variable in Table 3 had 37 observations, representing the 37 cities on OpenTable with complete data from February 18, 2020 to March 31, 2020. The lowest voting gap was in Naples, FL, which also had the lowest restaurant density and largest share of population 60+ years old, at 40%, double relative to the average city. Austin, TX, had the smallest share of population 60+ years old, at 15%. Denver, CO, had the lowest population density and Los Angeles, CA, had the highest population density. Its closest competitor was Honolulu, HI, with a population density of 1,625. The highest restaurant density of 6,547 was in Miami, FL. The closest competitor was Miami Beach, FL, located in the same county, which had a restaurant density of 2,869.

Table 4

The number of days it took the 37 cities in the dataset to first reach a 50%, 75%, and 95% decline in seated dining rates.

# Days	Actual Date	# Cities at -50%	# Cities at -75%	# Cities at -95%
22	03/11/2020	1	-	-
23	03/12/2020	2	-	-
24	03/13/2020	1	-	-
25	03/14/2020	4	-	-
26	03/15/2020	10	-	-
27	03/16/2020	14	14	2
28	03/17/2020	5	20	22
29	03/18/2020	-	3	7
30	03/19/2020	-	-	1
31	03/20/2020	-	-	5

Note: Table 4 is derived from OpenTable's city-level data on daily seated dining rates relative to each city's 2019, pre-pandemic, levels. The data starts on February 18, 2020 and continues to be updated to the current date. The seated diners come from a sample of approximately 20,000 restaurants on OpenTable in cities with more than 50 restaurants listed on OpenTable. The data for New Orleans was adjusted to represent its second decline to -50% due to the volatility around Mardi Gras.

New York City, NY, had the highest cumulative Covid-19 cases by March 20, at 4,419, and it was the second city to reach a 50% decline in dining, tied with San Francisco, CA. Table 4 shows that the first city to reach a 50% decline in dining was Seattle, WA, on March 11, within 22 days of the start of the dataset on February 18, 2020. Most cities reached an initial decline of 50% in seated diners between March 15 and March 16. New Orleans, LA, had a few volatile dining rates that significant and inaccurately skewed the data. After every city hit a 50% decline in seated dining rate, they each continued to decline, except for New Orleans. On March 3, New Orleans hit an initial decline of 50% compared to its 2019 levels, however, just two days later, it jumped up to be 5% higher than its 2019 levels. This volatility was primarily associated with different Mardi Gras dates in 2019 versus 2020. The second time New Orleans hit a 50% decline in seated dining rates was on March 15, at which point, it continued to decline. Thus, the

regressions use New Orleans' second 50% decline, but uses the first 50% decline for the remaining 36 cities. However, this change does not have any effect on the number of days it took New Orleans to reach a decline of 75% or 95%.

When comparing which cities reached -75% in seated dining faster, there is less variability as opposed to reaching -50%. The three early adopters, Seattle, New York City, and San Francisco each reach -75% in 27 days, on March 16. However, this was alongside 11 other cities. Despite being the first to reach -50%, a large portion of cities saw a sharper decline over a shorter period when it came to reaching -75%. No cities were impacted by any state-wide restaurant closure policies or stay-at-home orders prior to reaching -75% in seated dining. Thus, while this initial decline may have been influenced by government emergency announcements, it was not caused by state-wide mandates.

The first two cities to reach -95% were Cincinnati and Columbus, OH, on March 16, despite Cincinnati having the lowest cumulative Covid-19 cases in the dataset, at 7 cases. Ohio Governor DeWine issued restaurant closures for seated dining starting at 9pm on March 15, at which the dining rate was at -53% (DeWine, 2020). When the order went into effect on March 16, the dining rate plummeted to -100%. Thus, it's clear that the two Ohio cities' rapid decline relative to other cities was due to its state-wide mandate. In comparison, when San Francisco announced the first stay-at-home order on March 16, the dining rate had already dropped by 80%. When the order went into effect on March 17, the dining rate reached -100%, representing a less dramatic drop than seen in Ohio.

All cities reached -95% within 31 days, on March 20. Most cities saw sharp declines over a short period due to the introduction of local and state-wide restaurant closure policies or stay-at-home orders. The primary dependent variable of focus is the number of days it took each city

to reach a 50% decline in seated dining rates because this measure has the most variability across cities and is uninfluenced by government mandates such as restaurant closures and stay-at-home orders. Additionally, -50% measures the half-life of each city in its decline towards -100%.

5. Findings

The baseline OLS regression used in this research measures the number of days it took a city to reach -50% decline in seated dining based on the city's voting gap in the 2020 presidential election and the cumulative Covid-19 cases in each city on that day. To confirm whether the results are truly statistically significant, additional regressions were run to (1) account for a robust standard error, (2) exclude three key early adopter cities, Seattle, New York City, and San Francisco, and (3) include controls to avoid omitted variable bias.

Table 5 shows the regressions using the number of days until a city's seated dining rate is down by 50%. The Biden-Trump Vote Gap (%) is statistically significant even when including relevant control variables, using a robust standard error, and excluding the three key early adopter cities. The Cumulative Covid-19 Cases on March 20 is statistically significant when including relevant control variables and using a robust standard error. However, these results are heavily driven by the three early adopter cities, Seattle, New York, and San Francisco. When these three cities are excluded from the regression in specifications (4) and (5), the cumulative Covid-19 cases is no longer a statistically significant variable. None of the control variables, share 60+ years (%), population density, or restaurant density, are statistically significant.

Table 6 and Table 7 show the regressions using the number of days until a city's seated dining rate is down by 75%. Table 8 and Table 9 show the regressions using the number of days until a city's seated dining rate is down by 95%. The Biden-Trump Vote Gap (%) is statistically

significant even when including relevant control variables, using a robust standard error, and excluding the three key early adopter cities. However, these results are heavily influenced by the initial decline to -50%. When looking at the number of days until seated dining rates are down by 75% and 95%, controlling for the number of days it took seated dining rates to go down by 50%, both the Biden-Trump Vote Gap (%) and the Cumulative Covid-19 Cases on March 20 variables are not statistically significant in the regression specification (5) in Table 7 and Table 9. Specifically, when running the regression excluding the three early adopter cities, the findings for these two variables are either insignificant or only significant at the 10% level in Table 7 and Table 9. None of the control variables, share 60+ years (%), population density, and restaurant density, are statistically significant. The number of days until seated dining rates were down by 50% was included in the regressions on Table 7 and Table 9 to focus on the days between hitting -50% and -75% and between -50% and -95%. This variable is statistically significant but used as a control rather than an explanatory variable.

The findings indicate that the Biden-Trump Voting Gap (%) is a robust variable in explaining why some cities saw faster declines in seated dining rates than others. It is also important to note that all 37 cities' seated dining rates declined from 50% to 95% within 1.5 weeks which may suggest like-mindedness across cities. Although the behavior across the country changed rapidly, political ideology was still a driving factor in how quickly a city adopted Covid-19 safety measures by reducing its seated dining rates at restaurants.

Table 5

Decline in seated dining rates to -50%, determined by Biden vote, Covid-19 cases, and other controls.

	Dependent variable:				
	Days until seated dining rate is down by 50%				
	(1)	(2)	(3)	(4)	(5)
				3 outlier cities omitted	
Biden-Trump Vote Gap (%)	-3.350***	-2.754***	-2.654**	-2.148***	-1.759**
	(0.8350)	(0.8480)	(1.0930)	(0.6100)	(0.8500)
Cumulative Covid-19 Cases (on 3/20/20)		-0.000597***	-0.000679***	0.00136	-0.000382
		(0.0002)	(0.0002)	(0.0013)	(0.0015)
Share 60+ Years (%)			-1.511		0.277
			(3.5820)		(2.7940)
Population Density			0.000425		0.000495
			(0.0003)		(0.0004)
Restaurant Density			0.000146		0.0000801
			(0.0001)		(0.0001)
Intercept		27.23***	27.08***	27.05***	26.63***
		(0.2680)	(0.9950)	(0.2490)	(0.7860)
Number of Cities	37	37	37	34	34
R^2	0.315	0.396	0.444	0.222	0.298

* p<0.1; ** p<0.05; *** p<0.01

Table 5 Notes: Data is at the county level except for the daily dining rates. The data excludes cities with less than 50 restaurants on OpenTable, and the dependent variable's data is at the city level. The dependent variable for New Orleans was adjusted to represent its second decline to -50% due to the volatility around Mardi Gras. The voting gap represents the gap between Biden and Trump at the 2020 presidential election and is obtained from the MIT Election Data & Science Lab. The number of Covid-19 cases is the cumulative cases in each county reported on March 20, 2020 and is obtained from the New York Times. The share 60+ years (%) is obtained from the U.S. Census Bureau's 2019 estimate. The population density (100,000 inhabitants/m²) is obtained from the U.S. Census Bureau's 2014 - 2018 American Community Survey. The adjusted R^2 is the same at 0.169 and doesn't vary across specification.

Regression (1) only includes the key indicator variable, the Biden-Trump vote gap (%). Regression (2) includes both the Biden-Trump vote gap (%) and the cumulative Covid-19 cases as reported on March 20, 2020. Regression (3) builds on regression (2) by including the control variables, share 60+ years (%), and population density. Regressions (4) and (5) are the same regression as (2) and (3), respectively, but omit the three early adopter cities, New York, Seattle, and San Francisco, which are outliers. Running the regressions with a robust standard error does not change the degree of statistical significance of any variables.

Table 6

Decline in seated dining rates to -75%, determined by Biden vote, Covid-19 cases, and other controls, using a robust standard error.

	Dependent variable:				
	Days until seated dining rate is down by 75%				
	(1)	(2)	(3)	(4)	(5)
Biden-Trump Vote Gap (%)	-1.468***	-1.421***	-1.386***	-1.357***	-1.231***
	(0.3560)	(0.3320)	(0.3790)	(0.3600)	(0.4050)
Cumulative Covid-19 Cases (on 3/20/20)		-0.0000463	-0.000064	0.0000391	-0.000371
		(0.0000)	(0.0001)	(0.0012)	(0.0016)
Number of Cities	37	37	37	34	34
R^2	0.327	0.330	0.342	0.259	0.278

* p<0.1; ** p<0.05; *** p<0.01

Table 7

Decline in seated dining rates to -75%, starting from -50%, determined by Biden vote, Covid-19 cases, and other controls, using a robust standard error.

	Dependent variable:				
	Days until seated dining rate is down by 75%				
	(1)	(2)	(3)	(4)	(5)
Biden-Trump Vote Gap (%)	-0.866**	-0.889**	-0.839*	-0.794	-0.746
	(0.3960)	(0.4340)	(0.4510)	(0.4730)	(0.5040)
Cumulative Covid-19 Cases (on 3/20/20)		0.0000691	0.0000758	-0.000317	-0.000265
		(0.0000)	(0.0001)	(0.0011)	(0.0013)
Days until Seated Dining Rate is Down by 50%	0.179**	0.193***	0.206***	0.262**	0.276**
	(0.0663)	(0.0704)	(0.0739)	(0.1030)	(0.1120)
Number of Cities	37	37	37	34	34
R^2	0.446	0.451	0.470	0.403	0.422

* p<0.1; ** p<0.05; *** p<0.01

Tables 6-7 Notes: Data is at the county level except for the daily dining rates. The data excludes cities with less than 50 restaurants on OpenTable, and the dependent variable's data is at the city level. The voting gap represents the gap between Biden and Trump at the 2020 presidential election and is obtained from the MIT Election Data & Science Lab. The number of Covid-19 cases is the cumulative cases in each county reported on March 20, 2020 and is obtained from the New York Times. The share 60+ years (%) is obtained from the U.S. Census Bureau's 2019 estimate. The population density (100,000 inhabitants/m²) is obtained from the U.S. Census Bureau's 2014 - 2018 American Community Survey. The adjusted R^2 in Table 6 is the same at 0.229 and doesn't vary across specification. The adjusted R^2 in Table 7 is the same at 0.324 and doesn't vary across specification.

Regression (1) only includes the key indicator variable, the Biden-Trump vote gap (%). Regression (2) includes both the Biden-Trump vote gap (%) and the cumulative Covid-19 cases as reported on March 20, 2020. Regression (3) builds on regression (2) by including the control variables, share 60+ years (%), and population density. Regressions (4) and (5) are the same regression as (2) and (3), respectively, but omit the three early adopter cities, New York, Seattle, and San Francisco, which are outliers. All the regressions use a robust standard error.

Table 8

Decline in seated dining rates to -95%, determined by Biden vote, Covid-19 cases, and other controls, using a robust standard error.

	Dependent variable:				
	Days until seated dining rate is down by 95%				
	(1)	(2)	(3)	(4)	(5)
Biden-Trump Vote Gap (%)	-2.421***	-2.509***	-2.406***	-2.581***	-2.286**
	(0.6700)	(0.6070)	(0.8680)	(0.6240)	(0.9810)
Cumulative Covid-19 Cases (on 3/20/20)		0.0000879	0.0000431	0.0000275	-0.000928
		(0.0001)	(0.0001)	(0.0011)	(0.0018)
Number of Cities	37	37	37	34	34
R^2	0.272	0.275	0.306	0.260	0.294

* p<0.1; ** p<0.05; *** p<0.01

Table 9

Decline in seated dining rates to -95%, starting from -50%, determined by Biden vote, Covid-19 cases, and other controls, using a robust standard error.

	Dependent variable:				
	Days until seated dining rate is down by 95%				
	(1)	(2)	(3)	(4)	(5)
Biden-Trump Vote Gap (%)	-1.609**	-1.697**	-1.563*	-1.426*	-1.294
	(0.7820)	(0.7360)	(0.8180)	(0.7520)	(0.8560)
Cumulative Covid-19 Cases (on 3/20/20)		0.000264**	0.000259*	-0.000703	-0.000712
		(0.0001)	(0.0001)	(0.0010)	(0.0014)
Days until Seated Dining Rate is Down by 50%	0.242*	0.295*	0.318**	0.538***	0.564**
	(0.1310)	(0.1460)	(0.1490)	(0.1890)	(0.2110)
Number of Cities	37	37	37	34	34
R^2	0.339	0.362	0.399	0.427	0.46

* p<0.1; ** p<0.05; *** p<0.01

Tables 8-9 Notes: Data is at the county level except for the daily dining rates. The data excludes cities with less than 50 restaurants on OpenTable, and the dependent variable's data is at the city level. The voting gap represents the gap between Biden and Trump at the 2020 presidential election and is obtained from the MIT Election Data & Science Lab. The number of Covid-19 cases is the cumulative cases in each county reported on March 20, 2020 and is obtained from the New York Times. The share 60+ years (%) is obtained from the U.S. Census Bureau's 2019 estimate. The population density (100,000 inhabitants/m²) is obtained from the U.S. Census Bureau's 2014 - 2018 American Community Survey. The adjusted R^2 in Table 8 is the same at 0.178 and doesn't vary across specification. The adjusted R^2 in Table 9 is the same at 0.374 and doesn't vary across specification.

Regression (1) only includes the key indicator variable, the Biden-Trump vote gap (%). Regression (2) includes both the Biden-Trump vote gap (%) and the cumulative Covid-19 cases as reported on March 20, 2020. Regression (3) builds on regression (2) by including the control variables, share 60+ years (%), and population density. Regressions (4) and (5) are the same regression as (2) and (3), respectively, but omit the three early adopter cities, New York, Seattle, and San Francisco, which are outliers. All the regressions use a robust standard error.

To interpret these findings, I use the coefficients from the Table 6 regression specification (3), which is the OLS regression:

$$D_i = \beta_0 + \beta_1 G_i + \beta_2 C_i + \beta_3 X_i + \varepsilon_i$$

D_i measures the number of days it took each city to reach a 50% decline in seated dining, where i is the index for each city. G_i measures the city's voting gap in the 2020 presidential election. C_i measures the cumulative Covid-19 cases in each city by March 20, 2020. X_i controls for each city's population density, share of population 60+ years old, and restaurant density.

The estimates suggest that a 38% increase of Democrats in a city would lead a city to reach a 50% decline in seated diners one day earlier. For example, Naples, FL, has a voting gap of -25%, which means that President Donald Trump won that county's vote in the 2020 presidential election by a margin of 25%. In contrast, Cincinnati, OH, has a voting gap of 14%, which means that President Joe Biden won that county's vote in the 2020 presidential election by a margin of 14%. There is a 39% margin between Naples and Cincinnati's voting gap. Thus, the estimates suggest that if Naples' voting gap matched Cincinnati's, it would have reached a 50% decline in seated diners one day earlier.

Additionally, the estimates also suggest that an increase of 1,473 Covid-19 cases in a city would lead a city to reach a 50% decline in seated diners one day earlier. For example, New York's, NY, cumulative Covid-19 cases on March 20 were 4,419, the highest in the dataset. In contrast, Seattle, WA, was the next highest city, with cumulative Covid-19 cases of 794. There is a 3,625 difference between New York and Seattle's cumulative Covid-19 cases. Thus, the estimates suggest that if Covid-19 cases in Seattle increased by 3,625 to match New York, it would have reached a 50% decline in seated diners approximately two and a half days earlier.

6. Conclusion

This paper uses OLS regressions to study the epidemiological and political determinants of avoidance behavior. Using data on daily seated dining rates at restaurants provided by OpenTable, I specifically focus on whether political ideology affected early restaurant avoidance behavior during Covid-19 in March 2020 across cities in the United States. The main OLS regression measures the number of days it took each city to reach a 50% decline in seated dining based on the city's voting gap in the 2020 presidential election, the cumulative Covid-19 cases in each city, and other controls. The findings show that Covid-19 cases motivated early restaurant avoidance behavior, but this was concentrated around three key early adopter cities that all reached -50% prior to the federal emergency announcement. The findings also indicate that across all the cities, early adopters or otherwise, the voting gap in the cities with larger gaps in favor of the Democratic party saw declines faster, controlling for Covid-19 cases.

The coronavirus pandemic in the United States is a public health crisis that is heavily influenced by political ideology and polarization. Conflicting narratives between health experts, media outlets, and political leaders confused the American public and may have limited the effectiveness of the public health responses and policies. Going forward, public health experts would benefit from developing a strategy to implement effective policies during health emergencies in the face of political polarization and its influence on American behavior. Perhaps future research can aid this objective by analyzing how individuals' fears and expectations about Covid-19 influenced their behavior and how the media coverage influenced different cities across the United States.

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