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BUSINESS REOPENING DECISIONS AND DEMAND FORECASTS DURING THE COVID-19 PANDEMIC

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ABSTRACT

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Abstract

How quickly will American businesses reopen after COVID-19 lockdowns end? We use a nationwide survey of small businesses to measure firms' expectations about their re-opening and future demand. A plurality of firms in our sample expect to reopen within days of the end of legal restrictions, but a sizable minority expect to delay their reopening. While health-related variables, such as COVID-19 case rates and physical proximity of workers, do explain the prevalence and expected duration of regulated lockdown, these variables have little or no correlation with post-lockdown reopening intentions. Instead, almost one half of closed or partially open businesses said that their reopening would depend on the reopening of related businesses, including customers and suppliers. Owners expect demand to be one-third lower than before the crisis through autumn. Firms with more pessimistic expectations about demand predict a later reopening. Using an instrumental variables strategy, we estimate the relationship between demand expectations and reopening. These estimates suggest that post-lockdown delays in reopening can be explained by low levels of expected demand.

I. Introduction

The COVID-19 pandemic has led to economic disruptions that have not been seen since the great depression (Barker et al 2020, Bartik et al 2020, Khan et al 2020). Government-imposed restrictions or lockdowns, including regulations on what businesses may operate, have forced millions of businesses throughout the United States to temporarily shut down. Among policy makers, there is some optimism for a speedy recovery. For example, President Trump tweeted that if we "reopen our country" then businesses will rapidly come back online because "our people want to return to work." At the same time, even after restrictions are lifted, there may be important barriers to reopening.

First, business owners might have concerns about their own health risks, as reopening may expose them to COVID. Thus a business that can reopen in principle may choose to delay. Second, the

enormous dislocation associated with the pandemic may create coordination problems up and down the supply chain – which might make it difficult for businesses to reopen. Third, even before any government policies were imposed, many households began self-isolating to reduce the risk of transmission of COVID (Couture et al., 2020; Sears et al 2020, Gupta et al 2020). More broadly, businesses faced significant demand reductions that predated the lockdowns. Businesses might expect that demand will not return immediately after restrictions are lifted. This may also keep firms from reopening.

In this paper, we investigate businesses' decisions about reopening, focusing on two questions: First, as restrictions are relaxed, how quickly should we expect businesses to reopen? Second, to what extent are these different barriers driving decisions to reopen? To explore businesses' expectations about the end of regulatory restrictions on operations, future demand and reopening decisions, we use responses from a survey-experiment of tens of thousands of small businesses conducted by the small business network Alignable. Embedded in the survey is an information provision experiment on customer demand projections. We merge the survey-experiment results with input-output data from the BEA, O-NET data on workplace conditions, and crowdsourced data on industry attributes to shed further light on these questions.

We begin by documenting the current landscape of business closures and reopenings. Between late March and mid-May, the share of businesses in the Alignable surveys that were temporarily closed fell from 41 percent to 24 percent. However, the likelihood of being open varies considerably across different types of businesses. Businesses deemed essential (a classification that is dictated by regulatory guidelines) are 16 percent less likely to be temporarily closed. If a business's work involves physical proximity to other people, then the firm is also much more likely to be closed. Firms with older customers are less likely to be fully open, and more likely to be partially open. At the county level, COVID case prevalence also predicts temporary closure.

We also find that Republican vote share is a particularly powerful predictor of firms being fully open, even holding COVID case prevalence constant. This correlation remains after controls for regulations and local disease prevalence. This result is also consistent with separate but independent work by Alcott et al (2020), who find that areas with more Republicans are less likely to engage in social distancing, related to areas with more Democrats.

We then turn to expectations about reopening behavior and the end of legal restrictions on business operations. For the modal firm, regulations seem to be a binding constraint that prevents opening or reopening. The modal firm will open immediately or with a short delay upon legally being able to do so. The median firm believes that it will be closed for about two weeks after it is legal to open. However, there is a significant tail of firms that forecast longer delays. Eighteen percent of firms report delays in reopening of at least one month after the end of restrictions on their operations, and this estimate is likely a lower bound. Hence, while restrictions bind many firms,

there is also a meaningful share of business owners who intend to delay opening even after restrictions are lifted.

Why do these businesses expect additional delay? As mentioned above, there are three leading potential factors - health risks (for owners and employees), supply chain disruptions and challenges created by other firms being closed, and concerns about reduced demand. We explore each of these in turn.

First, we find that health concerns are generally not driving business decisions about when to reopen. We find that businesses in counties with higher levels of COVID cases expect that they will take more time to reopen. However, after controlling for the business's expectations of when legal restrictions will be fully lifted, this effect dissipates. We also find that worker proximity predicts the time until reopening. However, this also operates almost entirely through expectations about when regulations will end. Neither owner age nor customer age predict a longer time delay before reopening, once we control for owners' expected time until the end of restrictions. And, if anything, firms with older customers expect to reopen sooner. Moreover, none of these variables that capture health risks have a larger effect in areas where COVID rates have been higher.

Second, concerns that upstream firms might be closed plays only a minor role in delayed openings. Only 5% of firms that were not fully open at the time of the survey cited supply concerns as a barrier that would prevent reopening. Although 25% of fully open firms respond that a supplier closing would impact their ability to remain open, the fact that these supply-vulnerable businesses were operational suggests that the supply chain largely held up throughout the first few months of the crisis.

Downstream firms play a larger role in reopening decisions. When asked whether the closure of firms that are linked to them "would affect their ability to remain open", forty-eight percent cited their vulnerability to the closing of downstream firms, either because these firms are customers or refer customers. While most temporarily closed (or partially open) businesses were not waiting for other firms to fully open, among those who were waiting on other firms, five times as many cited downstream firms than upstream firms as a consideration in fully opening. This suggests that demand is the main channel driving reopening decisions. While these firms seem to have the ability to source materials and services, they often depend on a narrow range of customers for their sales.

Third, we find that expectations of limited demand play an important and causal role in explaining delayed openings. Overall, the demand projections are grim. The average firm in our sample expects that demand for their services will be 35.3 percent lower in September relative to pre-crisis levels.[1] Only 20.3 percent of firms in our sample expect that demand, by September, will have declined by less than 10 percent relative to the start of the crisis. All sectors are hard hit, but the drop in

[1] Unfortunately, we do not have price data, unlike Jaravel and O'Connell (2020), so we focus on the share of customers returning relative to before the crisis.

demand is expected to be most severe in three sectors: educational services, food and accommodation and arts, and entertainment and recreation. The expected drop in demand is lower for essential businesses, for businesses with older customers, and for businesses whose service cannot be provided online. We also find that political preferences seem to play a role: the Republican vote share strongly and positively predicts higher levels of projected future demand.

These demand reductions will lead to delayed openings, as firms expecting demand to be higher in the future are more likely to open quickly. To reinforce our causal interpretation, we implement two different instrumental variables approaches to estimate the link between future demand and the probability of being open. One approach uses experimental information provision, included in the survey, which changes respondents' beliefs about demand. The aggregation and presentation of information regarding demand from similar businesses shifts beliefs, as this information may be hard to ascertain for owners unilaterally. Optimistic owners shift beliefs downward, while pessimistic owners have rosier forecasts after receiving the information treatment. We compare firms with similar initial beliefs, but who were assigned to different information treatments or not provided with other owners' projections at all. A second approach instruments demand projections in businesses that sell to other businesses using the share of downstream customers that are in essential sectors. Both instruments yield similar conclusions and support a causal interpretation for the relationship between demand projections and reopening decisions. Over the longer-term, consumer demand is correlated with the firm's expected probability of being open in December.

Overall, our results contribute to understanding of the impact of the COVID pandemic on small businesses, and the barriers to reopening. Even though demand had already dropped before the lockdowns were in place, our results highlight that legal restrictions on business operations were binding - and that health concerns are generally not preventing businesses from reopening. Instead, we that demand from consumers and downstream firms plays an important role. Businesses expect demand to continue to be much lower than pre-crisis levels, and these demand reductions are causing businesses to stay closed longer. Many of these firms will delay reopening and perhaps close permanently as a result. This tremendous disruption to our economic system seems likely to create echoes that will reverberate for many years, and our estimates begin to provide long-term projections from the perspective of these business owners.

II. Data Sources

The Small Business Owner data used and referenced in this work was collected through surveys conducted by Alignable, Inc. Alignable <https://www.alignable.com> is the largest network and community of Small Business Owners in North America. We combine the survey data with business profile data from Alignable, historical revenues at the industry level from the Census, O-NET data to understand physical proximity of working conditions at the industry level, input-output data

from the Bureau of Economic Analysis to understand interconnectedness of businesses and the composition of upstream and downstream businesses, and data on geographic variation of COVID-19 cases obtained from the New York Times. Together, these data help to shed light on the factors driving business decisions about whether to reopen.

In this section, we describe the Alignable survey, its representativeness compared to Census data, and detail the other data sources used in the analysis.

About Alignable and the Alignable Small Business Survey

The Alignable platform has approximately 5 million registered small businesses across North America. Each week, Alignable distributes a survey link through email to their members. The link allows them to merge the individual responses of participants to data from their user profiles.

Our primary sample comes from one wave of Alignable surveys that focused on business reopening, with the link emailed out to users on May 9, 2020. This survey received 35,069 total responses to at least one question. 27,263 respondents completed all core questions that form the bulk of the analysis. The core questions contained several modules. The first module collected information about the current operational status of the business (fully open, partially open, temporarily closed, permanently closed) and any potential dependencies with other businesses that may affect their decision to fully open or their ability to remain fully open. The second module asked about future expectations about the return of customers to their business should they be fully open on a specified date that was randomized over different points in the future. Additional questions also asked about the expected reopening of other businesses. Respondents were also asked about when they expected legal restrictions impacting their business to be lifted, and when they are most likely to re-open fully if they were not already. A final question asked about the likelihood that the business will be operational come December 2020.[2]

In the middle of the survey, before questions regarding expected demand and expected reopening and survival, a subset of respondents were shown information about how prior survey respondents had projected demand. The message read "based on your profile, location, and concerns, our polls show that similar businesses anticipate [X%] of customers will return by [date]. The variable X was calculated using data from the first 16,038 respondents. One third of respondents after the first batch received this message.[3] The complete survey tool is available in the Appendix.

[2] A module tracking responses to CARES Act PPP status came prior to the final question about long-term business operations prospects, causing drop-off to 17,098 completed responses for this last question.

[3] One third of respondents saw a different message, but its mapping to a concept like demand is less clear.

Table 1 Panel A provides more detail about the data and the measures collected from the main May 9 survey.

We supplement this survey wave with questions from other survey waves. From earlier and later survey waves, we are able to construct a time series of business operational status using responses from 117,672 unique business owners from March 28 to mid-May, 2020. We merge in demographic details about the owner's age and industry details collected by Alignable in later surveys. We also include data on industry classification that comes from respondents entering their industry using a JavaScript predictive text entry box. Available options were the text of 4 and 6 digit NAICS industry descriptions. We also use a question, delivered toward the end of May in an external survey conducted by Harvard Business School, to assess how participants would evaluate tradeoffs between cash and health considerations. We presented users with a hypothetical grant, in amounts we randomized between $2,500 and $50,000. The grant could be one of two types: either the grant stipulated that the business would have to remain closed for two weeks to receive the grant, or the grant did not have conditions for receipt. We then asked users whether they would remain closed over the next two weeks under their particular hypothetical grant condition.

Comparison of Survey Responses with US Census Data

One challenge in conducting surveys of businesses is the potential for selection bias. This sample is selected in two ways: (1) they are firms that have chosen to join Alignable, (2) they are Alignable firms that have chosen to stay actively engaged taking surveys. Bartik et al (2020) provide a variety of diagnostic checks for a survey of Alignable businesses conducted in late March / early April to assess its representativeness, and shed light on sample selection. The sample provides broad coverage across the United States, across industries, and across business size (within small businesses). Roughly speaking, the sample matches Census data reasonably well along the dimensions of industry and geography, but the sample skews toward smaller businesses relative to the full set of US small businesses. A cross-validation against a phone survey suggests that these surveys provide reasonable estimates of business closure, though the random phone survey suggested the survey might over represent closed businesses.[4] This is consistent with the

[4] As a test of selection into taking surveys, Bartik et al (2020) reports the results of randomly calling 400 business owners using the contact information collected by Alignable at registration. The current status of these 400 business owners, open or closed, matches the ratio of open versus closed in a prior survey wave. This suggests that the survey responses are unlikely to understate the degree of businesses being permanently closed, at least conditional on having registered with Alignable.

expectations of Alignable executives who believed user engagement from businesses might be higher when they are looking for information about new opportunities.

Validation exercises of the May 9 survey wave reach similar conclusions to those in Bartik et al (2020). Figure 1 plots survey responses by firm size and compares the distribution to 2017 US Census data on businesses, derived from the County Business Patterns. Firm size in the survey is based on January 2020 employment, as reported by the respondent. The match is quite good along the firm size distribution. Figure 2 plots the geographic distribution of survey responses in the 10 large states in the survey and the Census; despite some minor sampling differences across states, the country is well represented.

Other Data Sources

Table 1 Panel B provides details about outside data sources that we merged with the Alignable data. We supplement the survey data with detailed characteristics about the industries of businesses at the 4-digit NAICS level. We determine the extent that each industry is able to serve online customers, and the likely age distribution of those customers, by posting a description of each industry on Amazon's Mechanical Turk, and asking a series of questions related to the nature of the industry and its customers. The first question asked is, "how easy or common would it be for this business to provide services or goods online?" The second question asked is, "how likely is it for customers of this business to fall in each age bracket (listed below)?" We offer answers that correspond with 0-10 percent, 10-25 percent, 25-75 percent and greater than 75 percent. Five unique individual Mechanical Turk responses were collected for each industry code and description. We average responses from these individuals at the industry level. The Table presents the raw responses, while later analysis uses Z-Scores for these variables to ease interpretation.

We collect information at the occupational level about the proximity of employees with each other and with customers the O-NET proximity variable "To what extent does this job require the worker to perform job tasks in close physical proximity to other people?" The underlying encoding of the proximity measure ranges from "I don't work near other people (beyond 100 ft)" as the lowest category to "Very close (near touching)" as the highest category. We follow Mongey and Weinberg (2020) by merging the O-NET version 24 proximity variable to the Occupational Employment Statistics (OES) data collected by the BLS. The OES data provides a mapping between occupation codes and NAICS industries. We take the employment weighted average of proximity by 4 digit NAICS code. We merge in input-output accounts data at the 3-digit NAICS industry level. We use the most recent data available at this level of granularity, which was collected in 2012. These data shed light on the industry composition of upstream and downstream

businesses for survey respondents.[5] Data about coronavirus cases at the county level were collected by The New York Times. While coverage is extensive, some counties were grouped together.[6]

III. The Evolution of Business Closures and Reopenings

In this section, we provide an overview of the evolution of business closures and reopenings, as well as expectations of future reopenings. Overall, we find that many businesses have already begun to reopen. Out of businesses that were already open, some are starting to transition from partly to fully open. The data suggest that most businesses plan to open as soon as lockdowns are lifted. However, a sizable block plan to delay their openings even after lockdowns are lifted.

Business closures and reopenings over time

Figure 3 shows the time trend in closures in the Alignable Surveys. At the end of March, when surveys began, forty-two percent of the businesses in our sample were temporarily closed. The share has steadily trended downward, as businesses have begun to reopen. By the beginning of May, more than two-thirds of businesses were open and that share increased to over three-quarters by the middle of May. The share of permanently closed businesses in our sample changes from 1.75% percent around April 1 to 2.3% around May 9.

While the share of temporarily closed firms in our sample is definitely declining, re-opening can mean many different things to different firms. Starting in the first week of May, the survey questions asked firms that were open about whether they were completely open or partially open. Thirty-four percent of our firms were only partially open in the first May survey. By the middle of the month, that share had fallen to under 28 percent, meaning that almost one-half of our sample was fully open by the middle of May.

American businesses have been reopening, but they have not been reopening everywhere at the same rate. Figure 4 shows a map of America with the share of businesses that are temporarily closed by state. In the Northeast, where the COVID death rates have been highest and regulatory responses strictest, the closure rates are also highest. In New York, Pennsylvania, Massachusetts and Maine, more than 37 percent of businesses were temporarily closed in early May. Closure rates

[5] The data are available at https://www.bea.gov/industry/input-output-accounts-data. We use the *Industry by Industry* matrix (total inputs by industry required (directly and indirectly) in order to deliver one dollar of industry output to final users) to identify downstream industries in the construction of the essential downstream businesses measure. Since this series captures production linkages and does not capture private consumption, we use the *use tables* to measure the share of industry output that goes to household consumption (rather than production) to categorize industries as consumer facing (B2C) or business-to-business (B2B).

[6] For example, a single value for New York City is reported, comprising New York, Kings, Queens, Bronx and Richmond Counties. The data are available at https://github.com/nytimes/covid-19-data

were also over one-third in New Jersey, Connecticut and other COVID hot spots away from New York, such as Michigan (where Detroit experienced a major outbreak) and Louisiana.

By contrast, closure rates are less than 20% in the states of the far west and Deep South with relative low disease prevalence. Alabama, Arkansas, Mississippi and Oklahoma make up one contiguous block of low closure rate states. Montana, the Dakotas, Wyoming and Utah represent another such block. COVID rates have been low in those states, and their typically Republican voters generally oppose government regulation. The other states lie between these two extremes.

Figure 5 plots closures against the county level unemployment rate, indicating that the impact is not being felt equally nationwide. Additionally, this figure helps to validate that the Alignable measures on business operations are correlated with administrative data on labor market performance. The striking correlations suggest the Alignable measures are accurately picking up economic activity at a granular level. Of course, as mentioned above, part of the county differences are driven by differences in regulations.

The current state of regulations is correlated both with expected delays until reopening and expectations about the time it will take to have no restrictions. In Table 2, we separate states that had stay at home orders in place as of the middle of May from states that did not have such orders. We classified 24 states as having stay at home orders in place on or after May 9, 2020.[7]

Twenty-seven percent of businesses in states without stay at home orders were temporarily closed. In states with stay at home orders, thirty six percent of businesses were closed. There is no difference between the two classes of states in the share of businesses that were partially open. The difference between the two types of states showed up primarily on the share of businesses that were fully open.

The stay at home orders also correlate both with the expected number of months until fully open and months until there are no restrictions. In states with stay at home orders, respondents expected that it would take 1.44 months until the restrictions were fully lifted and 1.7 months until they reopened. In states without stay at home orders, respondents thought that it would take 1.1 months until the restrictions were lifted and 1.38 months until they were fully open.

Figure 6 divides the businesses into four categories based on their operational status and shows the mean level of different firm attributes across those categories. The categories are fully open, partially open, temporarily closed and permanently closed. Our first variable is the O-NET occupation proximity score for the businesses' industry. From the data in Figure 5 alone, we cannot determine whether the link between this variable and business closure is because of direct fear of

[7] https://www.usatoday.com/storytelling/coronavirus-reopening-america-map/

contagion by the business owners and workers or because of regulation meant to stop high proximity behavior. Later we separately analyze the relationship in a regression framework.

Regardless of whether it is supply, demand, or regulation, high levels of proximity make it easier for diseases to spread, and unsurprisingly firms are more likely to be closed if they are in industries that involve high levels of physical proximity either between workers or between workers and customers. On average, 37 percent of the fully open firms are in above-median proximity industries. One half of the partially open firms are in above-median proximity industries. That number jumps to 65% for temporarily closed firms. Fifty-eight percent of firms that are permanently closed are in high proximity industries, which suggests that while proximity does make permanent closure more likely, other factors must also be driving the shuttering of particular enterprises.

The next variable is the population density of the county in which the business primarily operates. Density is correlated with both COVID cases and COVID deaths across U.S. counties, as of May 2020 (Glaeser, 2020). There is a slight positive relationship between density and the probability of being either partially open or temporarily closed, but the correlation between closure and local density is weaker than between closure and high proximity occupations.

The next variable is the ability of the business to sell their goods or services exclusively online, constructed at the 4-digit industry level with our survey data on Amazon Mechanical Turk. Some examples of industries identified as easily accessing customers online include, software publishers, cable and other subscription programming, investment pools and funds, professional scientific and technical services. We hypothesized that firms with high levels of online presence would be particularly likely to be partially open, as these firms could still partially serve customers without a physical presence or storefront. Somewhat surprisingly, we found no correlation between online sales and the probability of being partially open or temporarily closed. The result is largely explained by the physical proximity measure. The correlation between the ease of online sales and physical proximity is -0.46.

The health risks associated with COVID-19 increase sharply with age. For example, as of May 31, 2020, there had been 6,439 deaths associated with COVID-19 in Massachusetts among people over the age of 60, and 329 deaths associated with COVID-19 among people under the age of 60. Consequently, we hypothesized that the age of customers and owners would predict temporary closures, but there is almost no correlation between age and business status. For example, 26 percent of the owners of businesses that are completely open are over the age of 65 and 26 percent of the owners of the businesses that are temporarily closed are over the age of 65. Similarly, an older customer base does not seem to predict temporary closure.

The age of owner does however predict permanent closure. Thirty-four percent of owners of permanently closed businesses are over the age of 65. This correlation might reflect health concerns,

but just as plausibly, it could reflect the decision by people close to retirement to stop trying to make their business go amidst a maelstrom of pandemic and business closure.

The final variable shown in this figure is the vote share of the Republican Party at the county level in the 2016 election. There is a modest negative relationship, where the open businesses tend to be in counties with more Republican voters. This variable could reflect a lower level of regulation in more Republican areas or greater Republican optimism about either the level of economic dislocation or the risks of the disease.

As high proximity occupations were a particularly powerful predictor of business status, Figure 7 examines the time path of high and low proximity industries. We first split our sample into two parts based on whether the industry of the enterprise is above or below the median proximity level in our sample. We then look at the share of businesses that were temporarily closed at different dates in the two groups.

In the first survey wave at the end of March, over fifty percent of the high proximity industries were closed and less than thirty percent of the low proximity industries were closed. The share of both groups that were temporarily closed gently trended down in parallel through the beginning of May. In that wave, forty percent of the high proximity industry firms were closed and twenty-two percent of the low proximity industry firms were closed. In the most recent wave, the temporary closure numbers dropped significantly, especially for the high proximity industries. At our end point, slightly more than thirty percent of high proximity industry firms are closed, and about fifteen percent of low proximity industry firms are closed.

High proximity industries may be regulated by lockdown rules and those regulations may have eased over time. To examine the impact of regulations, Figure 7 also compares closure rates for essential and non-essential industries, using the classification described in Section II.

The closure rates for non-essential industries essentially tracks the closure rates for high proximity industries. Slightly more than one-half of the non-essential industries in our sample were closed at the end of March. By mid-May, the share of non-essential industries that were closed had fallen to about thirty percent.

A bit more than 30 percent of essential businesses were closed at the end of March, even though they were typically not regulated. That fact also suggests that businesses may well remain closed after the lockdowns end. By mid-May, the share of essential businesses that were closed had fallen below 20 percent, which is comparable to the closure rate for low proximity businesses.

Table 3 summarizes the correlates of current operational status of businesses in multiple regression form using the data from the May 9 survey. The table shows coefficients from four linear probability models. The four outcomes are mutually exclusive and so the coefficients must sum to zero. We have clustered the regressions at the county level.

The first row shows the coefficient on employee physical proximity. This variable has been transformed into a z-score, and so the coefficient -.105 implies that a one standard deviation increase in the level of physical proximity is associated with a 10.5 percentage point reduction in the probability of remaining fully open. This reduction in the probability of being open is countered primarily by an increase in the probability of being temporarily closed. A one standard deviation in the proximity measure leads to an 11.7 percentage point increase in temporary closure. Proximity of workers also has a small positive impact on permanent closure and a small negative impact on being partially being open.

The second row shows the coefficient on the owner's age, entered linearly. Given the strong correlation between age and mortality from COVID-19, we expected to find a significant link between age and temporary closure. The regressions show no such link. The only significant impact of age in the table is shown in the fourth regression. We find that older owners are more likely to permanently close their businesses, which may reflect a retirement decision for many of these owners. A 70 year old owner is 1.3 percentage points more likely to permanently close their business than a 40 year old.

The third row shows the impact of customer age. This variable has also been transformed into a z-score, which means that a one standard deviation increase in the share of customers over the age of 65 is associated with a .83 percentage point reduction in the probability of being fully open. While the sign of this coefficient is as predicted, we were surprised by the small size of the coefficient. The reduction in the probability of being fully open is offset by an increase in the probability of being partially open. A one standard deviation increase in the share of customers that are over the age of 65 is associated with a 1.3 percentage point rise in the probability of being partially open. There is no significant link between customer age and either the probability of being temporarily closed or of being permanently closed.

The fourth row shows the impact of being an essential business (at least as classified by both Delaware and Minnesota). Essential businesses are 12 percent more likely to be fully open and 4.3 percent more likely to be partially open. These businesses are 15.9 percent less likely to be temporarily closed and .4 percent less likely to be completely closed. The correlation between essential businesses and staying open could reflect both regulation and the level of demand, which presumably remained higher for essential businesses. We will later test whether essential businesses are also more or less likely to reopen when their respective states end lockdown regulations.

The fifth row shows the ease of operating online, as measured at the 4-digit NAICS industry level by the Mechanical Turk collection tool. Again this variable is a z-score. A one standard deviation increase in the ease of operating online is associated with a 1.6 percentage point reduction in the probability of being partially open and a .8 percentage point reduction in the probability of being fully open. The third regression shows that a one standard deviation increase in the ease of operating online is associated with a 2.4 percentage point increase in the probability of being

temporarily closed. We were somewhat surprised by these relationships, as we expected that businesses that can operate online would be more likely to stay open and operate online.

The sixth, seventh and eighth rows show three county-level correlates of current business status. In row six, we show the correlates of the logarithm of the number of COVID cases (plus one) per capita. We will interpret this variable as a semi-elasticity, so that a 10 percent increase in the number of COVID cases is associated with a .32 percentage point decrease in the probability of being fully open and a .26 percentage point increase in the probability of being temporarily closed. The number of COVID cases has a very small positive relationship with the probability of being partially open and a very small and insignificant negative correlation with the probability of being permanently closed.

We hypothesized that there might be more closures in denser environments because population density can make it easier for contagious diseases to spread. But the seventh row shows that density is positively associated with being fully open, holding fixed disease prevalence. A ten percent increase in population density is associated with a .15 percentage point increase in the probability of being open. A ten percent increase in density is linked to a .1 percentage point decrease the probability of being temporarily closed. The added customers associated with density appears to offset any downsides of disease spreading more rapidly in a dense environment.

Finally, in row eight we look at the Republican vote share in the 2016 presidential election. We interpret it as a measure both of political attitudes towards regulation, perhaps proxying for the actual regulations on the ground, and possibly of beliefs about the risks from the disease. We find that the Republican vote share is strongly associated with the probability of being open. A ten percentage point increase in the share of votes that went for the Republican presidential candidate is associated with a 3.2 percentage point increase in the probability of being fully open and a 2.3 percentage point decrease in the probability of being temporarily closed. The Republican vote share also generates a lower probability of being partially open, but has no correlation with the probability of being permanently closed.

While these results on essential businesses remind us that lockdowns do not completely determine closure rates, we now turn to the lockdown regulations and firms' expectations about those regulations.

How Long Do Businesses Think It Will Take For Lockdowns To End?

Our primary question about lockdown expectations is "If there are legal restrictions on fully reopening your business, when do you expect them to be lifted?" We turned categorical responses to this question into a number of months. We also included an option to respond with "there are no legal restrictions", and in that case we coded the number of months to deregulation automatically as a zero.

Figure 8 shows that expectations about when lockdown regulations will end differ sharply across U.S. states. The map strongly echoes the map of current businesses closures, which in turn echoes a map of COVID prevalence and deaths as of mid-May 2020. In the Northeast, the average business expected another 1.5 to 2 months of lockdown. In the mountain states, lockdowns were expected to last for 20 days or less. These responses likely reflect a combination of state and local industry-specific regulations, so there is no easy way to corroborate the accuracy of the expectations, but they correspond roughly with our expectations that the Northeastern states have high restrictions relative to most of the rest of the country.

Figure 9 shows that high and low proximity industries believe that they will face different regulatory hurdles. Each point represents the cumulative share of firms in a given industry that expects that it will be able to open fully on or before a given date. The two most prominent lines show the average across high and low proximity industries. About sixty percent of firms in low proximity industries say that they are legally allowed to open at the start of May. That share exceeds 90 percent by July.

The share of firms in high proximity industries facing regulation is much larger initially. Approximately forty-five percent of these firms say that they will legally be able to open in early May. By mid-June three quarters of the high proximity firms say that they can be fully open, as the series begin to converge. Businesses overwhelmingly expect that the regulations restricting their operations will be over by the middle of June. We now turn to their expectations about whether they will reopen after the regulations cease.

How Long Do Businesses Believe That They Will Remain Closed After Lockdowns End?

Figure 10 shows the distribution of firm expectations about when all lockdown regulations will end (x-axis) and when they expect to fully reopen their businesses (y-axis). We present the results as a matrix. The share of firms along the diagonal gives us the share of firms that say that they will reopen fully at the moment that they are legally allowed to reopen fully. The entries above the diagonal represent those firms that expect to take longer to reopen.

Somewhat surprisingly, there are also firms that expect to be fully open before the restrictions on fully opening end. We believe that this reflects the gray area around the words "restrictions" and "fully." For example, a state order that mandated social distancing in retail establishments can be interpreted as a limitation on the ability to fully open. Yet the same firm that expected that limitation to persist through July might choose to think of itself as being fully open at the time of the survey or at some other point before July.

The share of firms along the diagonal is quite striking. Forty-five percent of firms that expect the restrictions to end in July also expect to be open in July. Fifty-four percent of firms that expect the regulations to be over by early June expect to be open then as well. There is a particularly large share (60 percent) of firms that are on the diagonal among those firms that expect the

regulations to last until September or later. Since that category has no end date, we cannot infer what share of these firms expect to reopen when the regulations end and what share expect to remain closed for weeks or months longer.

For all survey respondents that listed August or earlier as their expected date of deregulation, at least 23 percent expected to take some time before reopening. Fifteen percent of firms that expected the restrictions to end by early June also expected to remain at least partially closed until July. Thirty-one percent of firms that expect lockdowns to end in late June expected that they would remain closed until July. This gap between the expected end of the lockdowns and the expected time of reopening is the primary concern of the remainder of this paper.

To further investigate the size of the gap, Figure 11 shows the gap between expected duration of the lockdown and the expected length of closure across states. Firms that are fully opened at the time of the survey are classified as zero time until full reopening. The distance between each dot and the forty-five degree line shows the average delay between the end of lockdown and businesses' projected reopening.

As we showed in Figure 8, there is considerable heterogeneity across states in the expected length of the lockdowns. High COVID level northeastern states expect the lockdowns to last far longer than low COVID Sunbelt states. Yet for almost every state there is an average gap between reopening and the end of lockdown that last between one and two weeks. This average gap sums together the significant share of businesses that expect to fully reopen exactly when the lockdown ends and the tail of businesses that expect to take weeks or months to reopen.

Table 4 shows that there is also considerable heterogeneity across industries in the expected gap or lag time between deregulation and reopening.[8] Accommodation and food service work is the lowest average gap industry (among businesses that are not fully open), but their two week average lag is largely the byproduct of having extensive regulations that prevent reopening. Together with arts and entertainment (another industry with a relatively short lag), many businesses are likely on the edge of survival, and a speedy reopening may provide the only possibility of continued existence. Construction has a slightly higher average lag, of about 3 weeks, but these firms anticipate shorter regulatory restrictions, as much construction work occurs outside and so risks of contagion may be lower.

For many large industries, the overall delay is split approximately fifty-fifty between expected regulatory delay and post-regulatory delay. Retail trade, educational services and health care all fit into this category. These industries expected significant delays overall that are explained by both regulation and other factors.

[8] Note that Table 4 excludes fully open businesses, so these summary statistics will not match those for the pooled sample that includes all responses.

Professional services firms and those in information have relatively high average lags, as most of these services can be delivered online relatively easily and these firms are likely to continue offering their services remotely rather than returning to fully in-person offerings. The overall delay for finance reopening is relatively short too, but all of that delay is attributable to firms' choices rather than regulation.

These cross industry differences show that in all industries there is an expected time gap between the end of regulations and the reopening of businesses. The patterns do not suggest any consistent explanation for what types of industries have the longest delays, as we see short delays in customer facing business (like restaurants) and in businesses that do not have face-to-face interactions with the customers (like construction). We will explore these patterns more systematically in the tables that are to come.

Just as there is a clear political pattern to the expectations about the end of lockdown, there is also a similar pattern to expectations about time spent closed after lockdowns end. Figure 12 shows a series of correlations between the 2016 Republican vote share at the county level and our expectation variables. The upper left hand graph shows the strong correlation across counties between Republican vote share and expected time to reopening. Businesses in counties with the lowest Republican vote shares expected to be closed for about two weeks longer than businesses in counties with the highest Republican vote shares. This overall correlation could reflect either expectations about regulations or about firm behavior when the regulations end.

The upper right hand side of Figure 12 shows the relationship between Republican vote share and expected number of months until the regulations end. Businesses in the highly Republican counties expect that the regulations will end about .3 months more quickly than businesses in the highly Democratic counties. Consequently, expectations about the future of lockdown regulations can explain some but not all of the gap in expectations about reopening dates. The lower left hand side of the figure shows that the expected time between the end of lockdown regulations and reopening also falls with the Republican vote share. Not only do more Republican areas expect the regulations to end more quickly, they also expect to reopen more quickly once the regulations end.

The lower right hand side shows the share of businesses that expect to reopen during the same time period when regulations end. This share also increases with the Republican vote share. But the shares of firms that will not immediately reopen is everywhere significant. This delayed reopening will shape the post-COVID recovery. We now turn to the reasons why firms might take long to recover and then test these reasons.

To shed light on the quantitative tradeoffs of remaining closed for an additional two weeks, we asked owners whether they would choose to open or close over two weeks if they received a grant. We randomized the size of the grant, and whether or not the grant included a conditional for receipt: to remain closed. We show the results graphically in Figure 16. Around three-quarters of

businesses chose to open with any sized grant when there was no condition to accepting the grant. When the grant was conditional on closing, half of small businesses would remain closed for an additional two weeks in exchange for a modest sum of $2,500, but a quarter of firms would reject $25,000 to reopen immediately. This indicates that for about a quarter of businesses, opening as soon as possible is of extreme value. For the majority of firms, the benefits or reopening for two weeks is limited but of higher value than being closed.

IV. Why Won't Businesses Re-Open After Lockdown?

We have documented that a sizable number of firms expect that they will remain closed after the lockdown ends. In some cases, the delay before reopening is projected to last for months. We now detail three different hypotheses about why firms may remain closed after lockdowns. We focus on the decision to open for firms that anticipate opening eventually.[9]

Our first hypothesis is that firms will delay reopening because they anticipate that demand will be limited. Limited demand could be due to either rising health costs of consumption or because customers' incomes have declined. The impact of reduced consumer demand will have a direct impact on firms that sell directly to consumers. Reduced demand will also indirectly impact firms that sell to other businesses if the downstream demand for those other businesses has faltered.

The survey directly asks owners about their future demand projections. If low demand is driving delays, then future demand should be lower for firms that anticipate more time to open after legal restrictions are lifted. Yet it is possible that firms that expect to delay reopening are merely justifying their behavior with statements about reduced revenues, which would lead to a spurious correlation between projected demand and reopening. We address this using two instruments for future demand. First, we use experimentally induced variation in information about future demand, which should shift owners' beliefs. A helpful feature of the survey is that as survey respondents were provided with information about projected demand from those who previously took the survey. We then test whether the information-induced shifts in demand expectations translate into changes in expectations about opening. Second, we focus on exogenous differences across industries in the level of demand. We use the BEA input-output tables to calculate the share of downstream businesses (i.e. business customers) that are in essential industries. We estimate separately the effect of this measure on future demand projections for businesses that sell mainly to businesses, and businesses that sell to consumers. For businesses that sell mainly to businesses, the share of downstream businesses that are essential increases demand projections.

Our second hypothesis focuses on the health risks to owners and employees, rather than demand. Both the entrepreneur and her workers may loath to reopen because of the risks of catching

[9] We acknowledge that the same forces that would induce firms to delay opening may also lead them to close altogether. Asking firms when they anticipate reopening was not done in the survey if owners responded they intended to permanently close their business.

COVID-19, either from fellow workers or from customers. The importance of health concerns in the owner's decision to reopen will differ across firms because of (i) local prevalence of COVID-19 in the general population (ii) physical proximity to co-workers and customers (iii) owner age and (iv) customer age. We test whether proxies for these different factors also predict a later reopening date.

We proxy for COVID-19 prevalence in the outside population with COVID-19 cases per capita in the county in which the business is located. We jointly address exposure to co-workers and customers by using a measure of workers' physical proximity to others, based on O-NET data. For some firms in our sample, the owner's age is available in Alignable's administrative data. Finally, we proxy for customer age via the MTurk survey instrument.

Typically, epidemiological predictions suggest that health risk increases with the interaction of these variables. For example, proximity to other workers will be particularly dangerous -- and demand from older customers may be particularly low -- based on the prevalence of COVID-19 in the local area. We test whether delays are particularly prevalent in firms that have high levels of risk along multiple dimensions.

Our third hypothesis is that firms will fail to reopen because of problems further back in their supply chain. The complex lattice of business interactions and the complementarities across firms creates the possibility of a significant coordination failure. Upstream firms don't open because they anticipate that their downstream firm customers will stay closed. Downstream firms don't open because they don't expect to receive inputs from their upstream suppliers.

To test this hypothesis, we use responses to questions that directly ask whether respondents anticipate supply problems or problems with downstream businesses and whether those problems will delay their reopening. We then use the Bureau of Economic Analysis input-output account data to predict timing of when downstream businesses open as a function of their classification as an essential or inessential business. We test whether firms that are in industries that primarily supply inessential businesses are themselves slower to open compared to firms in industries primarily supplying essential businesses.

V. Will Health Fears Deter Reopening?

Will continuing fears of COVID-19 slow the expected speed of business reopening? We now look at the correlation between reopening speed and health related variables, including the level of COVID-19 cases, employee proximity and owner and customer age. Table 5 provides our core results, looking at firm expectations about reopening, future restrictions and reopening conditional upon restrictions being lifted.

In regressions (1) and (4), we look at the expected time, in months, to fully reopen. Regressions (2) and (5) focus on expectations about how many months it will take for restrictions on fully

reopening to be lifted. Regressions (3) and (6) estimate the impact of health-related variables on reopening, controlling for the expected number of months until the full lifting of restrictions.

Regressions (1)-(3) include our entire sample of firms. Regressions (4)-(6) include only those firms that are not currently open. Both samples have benefits and disadvantages. Using the entire sample for a table that is focused on barriers to reopening includes many zeros, as those firms have already either reopened or never been closed. But using the closed subsample is also problematic, because the sample of firms that are closed looks quite different in low and high COVID counties.

Our primary specification is simply to use ordinary least squares regressions. We then check the sensitivity to using OLS on censored outcomes.[10] In the first column of Table 5, we look at the overall correlates of time to reopening. The specification includes firms that are already open and does not control for expectations about the lifting of current restrictions. The first row shows that businesses expect to be closed longer in counties where the number of COVID cases is higher. A 100 percent increase in the number of cases per capita is associated with about .08 months, or 2.5 days, longer until reopening. This correlation is statistically strong, but it is modest in magnitude. Using population-weighted statistics, the 90th and 10th percentile difference in log per capita deaths is 2.85, implying an opening delay of about 7 days between hard-hit and less affected counties.

The next two rows show the impact of worker proximity alone and then the interaction between worker proximity and COVID-19 prevalence in the county. Employee proximity is a significant predictor of delayed reopening. A one standard deviation increase in this variable is associated with a .26 month, or 8 day, delay in reopening. Perhaps more surprisingly, there is no interaction between COVID-19 prevalence and employee proximity. We hypothesized that employee proximity would be more problematic in high COVID environments, but there is little evidence that this interaction enters into firms' expectations about reopening. Figure 13 repeats the exercise in Figure 9, using distribution functions of total time to reopening by industry rather than time to restrictions being lifted. Patterns look very similar to the patterns regarding restrictions, with low proximity industries opening sooner.

The fourth and fifth rows look at owner age and the interaction with COVID prevalence. We expected that reopening would be less attractive to older owners who face greater mortality risk from COVID and that this effect would be larger in high COVID environments. But older owners

[10] For open firms, the time to reopening is censored from below at zero. For the closed firms, the time to reopening is censored above because the latest date for reopening they could report was September or later. To address censoring, Appendix Table A2 presents results using a Tobit regression. The results are similar in sign, but the Tobit coefficients when including all businesses are often larger in magnitude.

do not seem to expect to delay reopening and there is no significant interaction between age and the prevalence of the pandemic.

The sixth and seventh rows look at customer age and interactions with COVID prevalence. We expected to find that firms with older customers would be more likely to delay their opening, either because of reduced demand from skittish customers or out of concern for customers or legal liability. The coefficient goes in the opposite direction, where firms that serve older customers expect that they are more likely to open sooner. One possible explanation for this fact is that firms who serve older customers specialize in products, including health services, which are more likely to face robust demand. We also do not find a positive interaction between customer age and the COVID rate in the county.

The eighth row shows that essential businesses expect that they will open .3 months (or nine days) sooner than non-essential businesses. The ninth row shows the ease of operating online. This variable does predict an earlier reopening, but the effect is relatively small.

The last two rows show the impact of our two other county level variables: density and the Republican vote share in 2016. Density is negatively associated with time to reopening, either because of health-related concerns or because of regulation. Republican vote share is even more strongly negatively related to time to reopening.

The second column attempts to separate expectations about regulation alone from other firm beliefs about their own decisions. The outcome variable in this column is the number of months until all restrictions on business for this firm are lifted. Somewhat remarkably, almost all of the coefficients are quite close to the coefficients estimated in the first column. For example, a 100 percent increase in the number of COVID cases per capita is associated with a .08 month increase in the amount of time until all restrictions are lifted. The similarity of slopes with respect to health concerns and other factors suggests that a constant offset between lifting restrictions and reopening fits the data quite well. For example, a one standard deviation increase in physical proximity is associated with a one-third month increase in the expected time until restrictions are lifted. The coefficient is slightly larger but similar to Column 1.

One modest difference between the two columns is that owner age is negatively associated with the expected time until restrictions are lifted. That effect withstands county fixed effects, which is shown in Appendix Table A3, so it does not reflect any spatial correlation between owner age and local regulatory regimes. Older owners may be in industries that are less subject to local regulation, or they may just be more optimistic.

Overall, the second regression shows that our proxies for health concerns, when they matter for delays at all, seem to matter just as much for prognostications about the end of regulation.

Consequently, health fears may play little direct role in deterring firms' reopening patterns. To test this hypothesis, the third column looks at expectations about reopening, controlling for the expected time until restrictions are expected to be lifted. The coefficients in this column can be interpreted as telling us whether particular variables predict delays after reopening becomes legally feasible.

If firms were going to delay reopening because of health fears for either their workers or customers, then we would expect many of these coefficients to be significant both statistically and in magnitude. Yet we find that almost none of them are sizable. Both the COVID case and physical proximity coefficients retain statistical significance, but they are much smaller in size. The COVID cases coefficient drops by about 75 percent between regressions (1) and (3). The coefficient on employee proximity drops by over 80 percent. Figure 14 shows the gap in post-lockdown reopening between high and low proximity industries. There is no visible difference in time to reopening after lockdowns end. As we have already seen, this fact does not imply that there is no delay after the restrictions end. There is a delay, but the average delay seems to be essentially independent of the duration of the restrictions and is only loosely related with the health-related factors that we have explored. Instead, regulations appear to explain most of the variation in reopening times.

Regression (4) considers an indicator for a reopening time greater than 1 month from the lifting of restrictions. At the mean, 17.7% of the sample reports their planned date of fully reopening will occur at least 4 weeks after the date they believe restrictions will end. This estimate is likely a lower bound because we cannot calculate this lag for firms that believe restrictions will end after August. Over 80 percent of firms anticipate reopening within a month of being able to do so, but a significant share anticipate drawn out delays before fully reopening. There are only two significant variables, essential business and Republican vote share, suggesting that much of the variation in long delays is unrelated to health concerns.

Regression (5)-(8) repeat these regressions looking only at those firms that are currently closed or partially open. These firms are a selected sample, and the selection depends on COVID cases at the county level. A larger share of businesses are not fully open in counties with high levels of COVID. Figure 15 shows the relationship between the share of businesses that are now open and the level of COVID at the county level across counties with more than 110 businesses in our sample. Over forty percent of firms are fully open in the counties with low COVID rates. Less than twenty percent of firms are open in the counties near New York City that have the highest COVID rates.

This selection may explain why the level of COVID cases does not predict time to reopening in the fourth regression among firms that are closed. In the high COVID counties, most firms are closed and many of these closed firms have attributes that would make it easy for them to reopen. In the low COVID counties, the firms that are well suited for being open are already open and consequently only the most vulnerable firms are closed. Those firms may not expect to be open

soon. This selection problem makes it difficult to interpret all of the county level variables in this later sample.

Only a few variables are significant in regression (5). Firms with older customers expect that they will open sooner. Firms in essential industries expect that they will open sooner. Firms in counties with a higher Republican vote share also expect that they will open sooner.

The sixth regression again looks at beliefs about when regulations will end. Those same coefficients again predict expectations about deregulation Essential businesses expect regulations to end more quickly. Firms in more Republican counties expect that regulations will end sooner. Firms with older customers also expect that their regulations will end more quickly.

In the seventh regression, we look at the correlates of post-regulatory delay among the sample of firms that are currently closed. The patterns in this regression are broadly similar to those before, except physical proximity and the measure of local pandemic severity become insignificant for explaining the lag among these businesses. These patterns continue to hold in column 8, where 28% of the businesses that were not fully open anticipated having delays in reopening greater than 1 month. The primary difference between this and other columns is that the sign on COVID cases becomes negative, underscoring that the set of businesses in this regression are selected based on differences in county characteristics.

This table and the related figures tell a clear story that health concerns matter greatly for regulation, but not for firms' behavior post-regulation. Firms with older customers expect to reopen sooner rather than later. Greater COVID-19 prevalence predicts expected regulatory delay, but does not predict economically significant differences in firm behavior post-regulation. We interpret this as suggesting that firms opening behavior might suggest there are health concerns, but digging deeper suggests these patterns arise because of regulations.

Another piece of evidence that supports this view is shown in Figure 16. We gave respondents a hypothetical question about whether they would be willing to remain closed if they received either an unconditional grant or a grant that is conditional upon remaining closed. We randomly varied the size of the hypothetical grant. If owners wanted to remain at home because of health fears, then we would expect the unconditional grant to have a large impact that increases with the size of the grant, as larger grants would allow owners to consume or pay their bills without the need to access cash flows generated from the business. Reopening decisions were invariant to the size of the cash grant, which we interpret to suggest that owners are not trading off liquidity concerns with worries about well-being.[11]

[11] These findings contrast with other work that shows commuting often slowed dramatically before lockdown regulations were put into place, suggesting that some firms stopped in-person work before they

This suggests there is substantial residual variation in reopening times that is not captured by average health risk, conditions on the ground (cases, density), industry characteristics (proximity, essential), or attitudes (GOP vote share). While regulation explains a substantial portion of the reopening variability, much remains. We explore two additional hypotheses in the next section: coordination with other businesses in the ecosystem and reductions in (or uncertainty about) demand.

VI. Reopening and Coordination between Customers and Suppliers

The COVID-19 shock shut down wide swaths of the American economy. The decision to reopen a business is not an independent decision by a solitary entrepreneur. That entrepreneur's decision will surely hinge on the presence of customers and suppliers. Upstream suppliers may have closed. Consumers may have far less demand for a particular company's products, either because of COVID fears or because of reduced income. Downstream business demand may also have vanished, either because of closure or because of other disruptions throughout the lattice of business relationships.

Coordination problems may make reopening the American economy particularly rocky. If each business waits for the other one to start work again, then that could add months to the delay before full economic recovery. In this section, we estimate firm's expectations about future demand and whether those expectations can explain the time gap between the end of restrictions and fully reopening.

Figure 17 illustrates the complementary nature of businesses throughout the U.S. The top panel asks those businesses that are currently open "Although you are currently open, if these other businesses closed, would it affect your ability to remain open? (Select the category that matters most.)" Thirty six percent of open businesses said their ability to remain open would be impacted if their business customers closed. A business' survival is naturally contingent on the presence of demand for its services or products.

Twenty-seven percent of businesses said that the closure of other businesses would not impact their own survival. While this represents the second most common answer to this question, there were still more than 70 percent of respondents who did not say that other businesses were irrelevant. We interpret that fact as confirming the interdependent nature of business survival.

Almost as many firms noted that if their suppliers closed, then this would also affect their survival. Suppliers mattered less than customers among this group, but both were important. A smaller

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were forced to do so. On the reopening question, our analysis would point to more firms reopening quickly, but it is possible that our analysis is putting more weight on small firms that had lower capacity for telecommuting or were less exposed to potential health-related lawsuits.

share also cited the importance of businesses that refer them customers. If we add together the businesses that refer and the business customers, we find that almost fifty percent of firms emphasized downstream linkages. That share is almost double the 25 percent of firms that highlighted upstream linkages.

This difference between upstream and downstream connections is also shown in the bottom panel of Figure 17. This panel shows the responses to a question that was asked only of firms that were temporarily closed or partially open: "are you waiting on other businesses to open before fully opening yourself?" Somewhat surprisingly, more than one-half of our small businesses said no. A majority of currently closed businesses do not require any coordination with other businesses. Sixty-five percent of respondents to this question are in consumer-facing businesses, helping to explain these results. For the business-to-business respondents presented with this question, it is likely that their business customers were already open at the time of the survey.

Nonetheless, almost one-half of businesses did note that they were waiting on other businesses. The largest category in this group was firms waiting on business customers. Together, more than 20 percent of respondents said that they were waiting for either customers or businesses that refer customers to them. This represents more than 40 percent of the dependency in this sample. Later, as we analyze how demand affects reopening, we examine this issue in more detail with data from the BEA input/output tables.

Another 20 percent said that they were waiting on businesses that were similar to themselves to open. While we might usually think that the reopening of other competing businesses would depress demand for a particular enterprise, the respondents seemed to take the opening of their competitors as a signal that demand has returned. There may also be some advantage to waiting and learning from the reopening experience of similar firms.

Only five percent of respondents cited the need to wait until suppliers reopen. This share does not mean that suppliers are important. The top panel confirmed that if supply relationships end, then this can shut down a business. Instead, this means that currently closed firms are not worried as much about supply, presumably because upstream firms are more likely to be open, or because global supply chains allow them to source inputs from somewhere else. If upstream suppliers are producing goods in lower density factories, then it was likely easier for them to remain operational than downstream businesses.

These results confirm the importance of linkages for reopening, but also suggest that slightly more than one-half of currently closed firms can reopen without any other firm reopening as well. The results suggest that downstream linkages seem likely to be a more important challenge for reopening than upstream linkages. For that reason, we now turn to the firm's forecasts about future demand and the impact of future demand on projected reopening behavior.

Forecasting Post-Crisis Demand

We start with the firm's forecast about future demand. The survey asked owners to predict what share of their pre-COVID demand would return in the future. The future date was one of six randomized dates ranging from early May to September. The exact wording was: "If you are fully open in [date], what share of your customers do you expect at that time, compared to before the crisis? Please provide your best guess." Response options were top-coded at "greater than 90 percent".[12]

On average, across all industries, demand is expected to return to 65% of its pre-COVID level by September. Table 6 reports both the share of firms that expected their demand to fully return (90 percent or more of their pre-crisis levels) and also reports the mean level of demand predicted, again relative to pre-crisis levels.[13]

The first row shows that only seven percent of respondents in "arts, entertainment and recreation" expected demand to exceed ninety percent of pre-crisis levels in May. That share only rises to 11 percent in September. Consequently, ninety percent of these firms expect to experience a decline in demand of ten percent or more through the fall. The mean level of projected demand in this industry begins at 37 percent of pre-crisis levels and reaches 55 percent of pre-crisis levels by September. Firms in the arts expected a truly massive decline in demand for the near future.

Whereas the arts appear to be the more vulnerable sector, finance and insurance appears to be the sector with the smallest reductions in demand. Even in May, the financial firms believe that they will have two-thirds of their pre-crisis demand. That forecast rises to seventy percent by September. Still only twenty-seven percent of all financial services firms project that their demand will be ninety percent of pre-crisis demand or more by September.

The other face-to-face sectors, including educational services, retail trade and restaurants and accommodation, all expect large decreases in demand through September. Accommodation and food service providers expect their demand to be 58 percent of its pre-crisis level in September. Eighty-seven percent of firms in educational services expect a ten percent or greater drop in demand in September.

Industries that deliver information-intensive products are the most optimistic about future demand. Professional and technical service providers predict that their demand will return to two-thirds

[12] It is possible that our estimates miss some reallocation of demand because of top-coding of survey responses (Barrero, Bloom, and Davis 2020). Table 6 allows an assessment by examining the share of responses indicating demand would exceed 90% of its pre-pandemic level.

[13] Appendix Table A4 shows a more granular industry breakdown.

crisis levels by September. Information service providers predict that their demand will be at 65 percent of pre-crisis levels by the same date.

These businesses expect a quite significant reduction in demand, and there is considerable heterogeneity across industries in the expected drop in demand. Before we examine whether these drops in demand can explain slow rates of re-opening, we turn to a more systematic exploration of the correlates of predicted drops in demand.

Table 7 shows predictors of demand for all businesses (column 1) and businesses that are not fully open (column 2). The regressions pool results for projected demand across future months, and include a control for the reference month that was contained in the survey question. To separate the impact of regulations from other factors, we control for the months until reopening restrictions are lifted. In both columns, the length of delay until the lifting of restrictions is associated with lower levels of demand. One more month of restrictions is associated with 17.4 percent lower demand in the entire sample and a 13 percent reduction in demand in the sample that is currently not fully open.

One interpretation of the correlation between the expected length of restrictions and the reduction in demand could be that firms anticipate that consumers will switch to alternative suppliers and alternative products if the delay lasts longer. In this case, the lost demand might be recouped across different sectors of the economy, even though this specific firm has lost customers. An alternative interpretation is that restrictions are correlated with reduced demand because both reflect omitted factors, such as aspects of the health crisis that are not captured by our COVID case measure.

With the exception of employee proximity, most of our health related variables are not correlated with projected demand. The level of COVID cases itself is unrelated to the expected drop in demand. Owner age is uncorrelated with projected future demand, while customer age is positively correlated. Presumably, this reflects the tendency of older customers to have more stable consumption patterns and to purchase services, like health care, that they are still likely to need going forward.

A notable exception is businesses where employee proximity is higher. A standard deviation increase in proximity reduces demand forecasts by between 7 to 9 percent across specifications, and there is also a negative interaction effect with COVID cases, and magnitudes are larger for businesses that are not fully open. Comparing these magnitudes for demand reductions in high proximity businesses to these businesses' reopening plans suggests that despite the potential for demand to decline, owners will likely reopen high proximity businesses to serve a smaller customer base. These workplaces appear able to operate at a smaller scale than their pre-pandemic levels,

possibly because the opportunity cost of operating (a service provider's outside option) has deteriorated.

Two other industry-specific variables also predict demand. Projected demand is about 11 percent higher, in almost all specifications, for essential businesses than for non-essential businesses. This supports the view that essential businesses are less volatile. If demand were not top-coded at "greater than 90 percent" we might have detected an even larger boost in demand for essential businesses.

There is also a greater drop in demand for businesses than can be performed online. One interpretation for this fact is that the businesses in our sample expect that they will lose their customers to online competitors. An alternative view is that ease of online delivery captures relatively non-essential services.

Two place-based variables predict expected future demand. Future demand is generally higher in more dense areas, possibly because these larger markets will make it easier for the businesses to find a new set of customers. Future demand is strongly related to the share of Republican voters in 2016.

The Impact of Demand on Re-opening

We now turn to the impact that projected demand will have on future reopening. Figure 18 splits businesses based on their expectations about the share of businesses like them that will be open. In this way, we can group firms based on their expectations for their sector, not just their own firm. We then show the evolution of beliefs about customer demand based on beliefs about reopening.

The top line shows those firms with the most optimistic projections about reopening also have the most optimistic beliefs about future demand. The group that expects that ninety percent or more of firms like themselves will be open also believes that they will have seventy percent of their pre-crisis demand in May, which rises to 75 percent by August. Firms that believed that 75 to 90 percent of firms like them will reopen expect demand to be slightly above 60 percent of pre-crisis demand in May and closer to 70 percent of pre-crisis demand in August.

By contrast, the most pessimistic firms have very low expectations about market demand. Those firms that project that 90 percent or more of firms like them will be closed estimate that demand will have dropped by 75 percent in May relative to before the crisis. This group expects demand to increase by August, but still to remain well below one-half of pre-crisis demand. Those firms that expect that between eighty and ninety percent of firms like them will be closed also predict a demand drop of more than fifty percent in August relative to the pre-crisis period. These relative

differences between groups suggest that demand and reopening decisions are likely closely linked despite the potential for top coding in the survey to understate the extent of future demand.

However, the between projected demand and projected firm closure does not imply that demand drops are causing firm closure or delayed reopening. Equally possible is that some respondents are pessimistic overall and expect bad things to happen along every dimension. To address this issue, we have two ways of estimating the causal relationship between demand and firm closures.

Our first source of exogenous variation is an information treatment within the survey itself. The survey first asked people about expectations related to future demand. The survey then revealed, to a randomly selected subset of respondents, the predicted changes in demand by other members of the same business type (serving business customers or consumers), who expressed the same concern about business dependencies, are in the same region of the U.S., and who were asked about the same date in the future. The precise wording of the message was: "Based on your profile, location, and concerns, our polls show that similar businesses anticipate [X] % of customers will return by [date]." Date in this case is the same date used for subsequent questions about expected demand. The survey then asked about their own beliefs about demand and finally about their predicted behavior around re-opening. For individuals whose initial beliefs were below those in the industry, the revelation pushes beliefs upward. For those with more pessimistic beliefs, the revelation pushes beliefs downward. We use the gap between the aggregated information displayed and the initial beliefs as our instrument. Initial beliefs are elicited through a related set of questions at the beginning of the survey before the information is shared. Because these earlier questions allow us to infer demand expectations (but do not ask about them directly), we combine the questions that precede the information treatment in a linear model, estimated with ordinary least squares, to predict beliefs for the exact question about return customers. The prediction model is estimated only using an early batch of respondents that did not receive any information and who are excluded from the remaining analysis. We refer to this prediction as the prior beliefs about customer demand in Table 8.

Table 8 Panel B displays the first stage regression. The instrument, which is the interaction between receiving information in the survey and the difference in the logarithm of the signal and the constructed prior belief, has a strong positive impact on predicted demand. A 10 percent larger gap between the signal and prior, or a 0.1 log point increase, leads to a roughly 2 percent increase in the owner's projected demand. This shows the posterior beliefs move in the direction of the signal. Note that throughout this table, we present results with a standard set of controls germane to the instrumental variable specification in particular. We also add columns with an additional set of controls from the more expansive OLS specification in Table 5. Results are stable across these two alternative specifications.

Columns 3- 10 show reduced form estimates, where the various outcomes (lags to reopening, lags to reopening with restriction date fixed effects, indicators for long lags, and indicators for long-run prospects) are regressed directly upon the instrument. These results are again stable across specifications. The reduced form coefficients show the importance of the instrument, presumably through the demand channel, on these outcomes.

Panel A presents the two-stage least squares estimates of the causal effect of changes in projected demand. In column 1, we estimate that a 10 percent increase in projected demand decreases the time to reopen by 0.088 months or roughly 2.7 days. This point estimate is stable when we include additional controls for a range of industry (proximity, ease of conducting business online, etc.) and geography (COVID cases, population density, GOP vote share, etc.). However, when we include fixed effects for the projected date that restrictions will be lifted, the coefficient falls to 0.53, meaning that a 10 percent demand increase will reduce time to open by about 1.6 days.

The estimates in columns 1-4 reflect changes in the average time to reopen caused by shifts in demand projections. However, these means necessarily obscure differences across various margins. Columns 5-6 look at long-lags of greater than 1 month. Here a 10 percent increase in demand reduces the probability of a long delay in reopening by about 1.6 percentage points, or an 8 percent reduction relative to the mean. This highlights the long-tail of reopening times, and suggests that pessimistic owners are influenced by changes in their demand projections.

In column (7), we look at the probability of being operational by the end of 2020 as our dependent variable. A 0.1 log point increase in the gap between the signal and the prior increases the expected probability of survival by 3.1 percentage points. In other words, a twenty percent increase in demand is predicted to increase the survival probability by six percentage points. Given that the mean failure rate is twenty percent, a drop from twenty to fourteen percent is economically highly significant.

What do these estimates imply for the delay in reopening? On average firms predicted that their revenues will fall by 38 percent. Using the coefficient of -.168 in Panel A Column (5), this implies that the drop in revenues (relative to pre-COVID levels) will cause an additional 6.4 percent of firms to wait at least one month from when restrictions lift to when they choose to reopen. Since less than 20% of the sample estimate a delay of one month or more once restrictions are lifted, the drop in demand appears responsible for increasing the share of business with this kind of significant delay by roughly 34 percent.

We also conduct another test of the demand that comes from the importance of downstream relationships, based on interlinkages among businesses (Baqaee and Farhi, 2020). For every 3 digit NAICS industry, we calculate the share of downstream businesses that were either essential or inessential using the Bureau of Economic Analysis Input-Output Tables.

Figure 19 (red line) shows the relationship between time to open for consumer facing business and the share of downstream firms that are essential, which we take as a reduced form for downstream demand. Because downstream demand for consumer-facing businesses is mostly made up of households, while this measure is about downstream sales to firms, we expect the relationship to be weak, as confirmed by the red line in Figure 19. By contract, the blue line shows a much stronger relationship between business-facing-businesses and the share of downstream businesses that are essential. For business-facing firms, having 100% essential downstream sales compared to 0% increases reopening speed by nearly 6 weeks. A test of the similarity of the reduced form coefficients in this relationship is presented at the top of the figure.

Table 9 estimates the IV regression analog of the relationship between reopening and demand, using the downstream share of customers in essential industries as an instrument. This exercise is similar to that of Table 8, but instead we instrument with downstream industry characteristics. While this has the benefits of introducing variation based on current conditions rather than future projections, it has limitations due to the fact that 3 digit NAICS industries only provide a relatively small number of observations with independent variation (we can match 75 industries to the BEA data).

The final regression includes both the uninteracted share of downstream essential businesses (from Figure 19) and the business-to-business indicator as controls. The instrument itself is defined as the interaction of the downstream essential business share and the business-to-business indicator. All specifications control for whether the owner's own industry is essential, to account for the possibility that suppliers of essential businesses may also be considered essential.

Our results look similar qualitatively to those in Table 8, although effect sizes are larger than those documented previously. To provide context, we focus on delays that extend beyond one month, as displayed in columns 5 and 6. According to these estimates, a 10 percent increase in demand reduces the propensity for long delays by about 4 percentage points, or an approximately 20 percent reduction relative to the mean. By contrast, the results in Table 8 imply a reduction in the propensity for long delays by about 8.5 percent relative to the mean. The differences in estimates likely reflect differences in the source of variation: with demand as currently realized based on restrictions on inessential businesses contributing to realized changes for everyone. On the other hand, the first stage relationship is weaker, which may give rise to additional imprecision in the estimates. Both sources of variation, however, point to an important role for reduced demand (or demand expectations) that hinder reopening.

The Impact of Demand and Other Variables on Survival

One of the most important questions about the COVID related lockdown is whether a temporary period of firm closure will lead to permanent elimination of thousands or millions of American

businesses. Consequently, we now look at whether any of our variables predict survival until December of 2020. We have already estimated the impact of demand on survival in the last two columns of Tables 8 and 9, but we have not linked this survival rate with any of our other variables. In both exercises, demand is positively related with long-run survival rates, often substantially so.

In Table 10, we build in the correlation between our core set of additional variables and the probability of survival until December. The first two rows look at the impact of projected demand and months until the end of restrictions. Projected demand positively predicts survival, but the estimated coefficient is smaller than in all of the two stage least squares estimations.

The most striking and important fact is that the length of expected restrictions is strongly negatively associated with the probability of survival. As the expected restriction duration increases by 1 month, the probability of survival drops by 2.6 percentage points. This fact does not mean that restrictions are wrong, but it does suggest that the economic cost of longer lockdowns, especially as experienced by small entrepreneurs, is likely to be large.[14]

Three other variables are significant in every specification. Essential businesses are between 1.2 and 2.1 percentage points more likely to survive. This gap could reflect the advantage of being able to continue in business throughout the crisis, or it could reflect more stable demand for essential businesses.

Firms with higher worker proximity are less likely to survive. A one standard deviation increase in worker proximity is associated with more than a 1.5 percentage point decrease in the probability of survival. This may reflect the expected difficulty of operating in a high contact work environment over the coming months. Finally, businesses with older customers are more likely to survive, possibly because this customer base is more stable. None of the other variables have reliable correlations with the probability of survival.

VII. Conclusion

The Alignable Survey of Small Business Owners provides a snapshot of small business behavior and expectations during the unprecedented COVID-19 crisis. Firms are gradually reopening, but some places are reopening faster than others. Places with high Republican vote shares have both eased restrictions more quickly and expect to see faster rates of business reopening.
Although restrictions are an important determinant of the reopening decision, many businesses expect to delay reopening when the restrictions lift. The average business in our sample expects

[14] Past work, since at least Hamilton (2000), suggests that many small businesses are likely to be fragile even in good times. Related work studies how business owners respond to shocks over their careers (Dillon and Stanton, 2017; Hincapie, 2020; Catherine, 2019).

to be closed two weeks longer than the restrictions last, although some businesses expect to be closed for months after they are legally allowed to reopen. Policy-makers should not expect that when the restrictions end that everyone will immediately rebound.

The delay in reopening does not appear to be related to health concerns, at least for the small businesses in the survey. The lag between the predicted end of restrictions on operations and the predicted time for reopening is not correlated with any of our measures of health risk. Neither older customers nor an older owner predicts a longer delay after the end of restrictions. And while COVID case prevalence predicts the presence of restrictions on operations into the future, COVID cases per capita do not predict delays in opening after restrictions on operations are lifted. These facts suggest that small firms' reopenings are driven more by their economic needs to survive than by their worries about public health.

Several other findings underscore the importance of demand projections and interdependencies among businesses for owners' reopening decisions. We use two different instruments for projected demand that yield similar results, suggesting that the reopening decision is closely tied to expectations about future demand. If downstream businesses don't open, then this will reverberate up through the network of firms.[15] Adding to the headwinds businesses face, this crisis is both a health crisis and an economic crisis. Businesses expect that the level of demand for their services will be greatly depressed for many months to come.

[15] See Akbarpour et al. (2020) for a discussion of other aspects of networks related to reopening policy.

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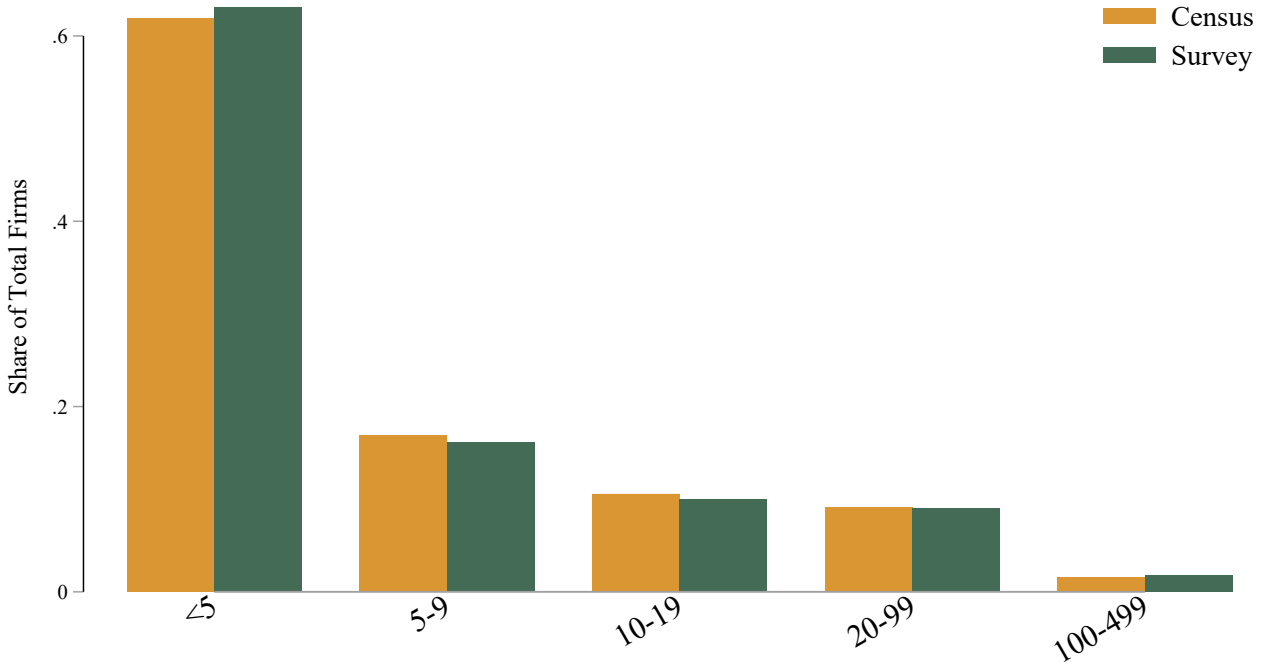


Figure 1: Firm Size in the Survey and Census

This figure plots the share of firms in each employment category for the 2017 Census of US Businesses and the survey respondents. The sample size is 22,492 responses from May 9th survey wave with non-missing employment data.

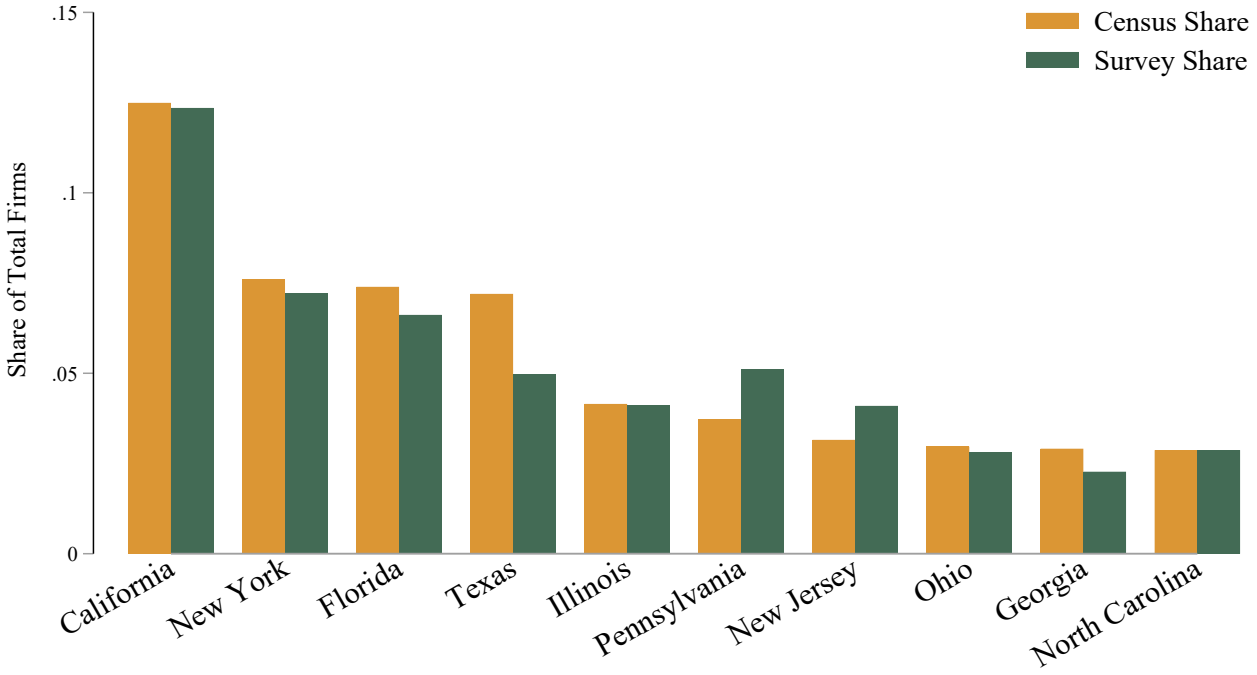


Figure 2: Firm Locations in the Census and Survey

This figure plots the share of firms in each state for the 2017 Census of U.S. Businesses and the survey respondents for May 9, 2020. The sample size is 34,941 responses from May 9th survey wave with non-missing state data.

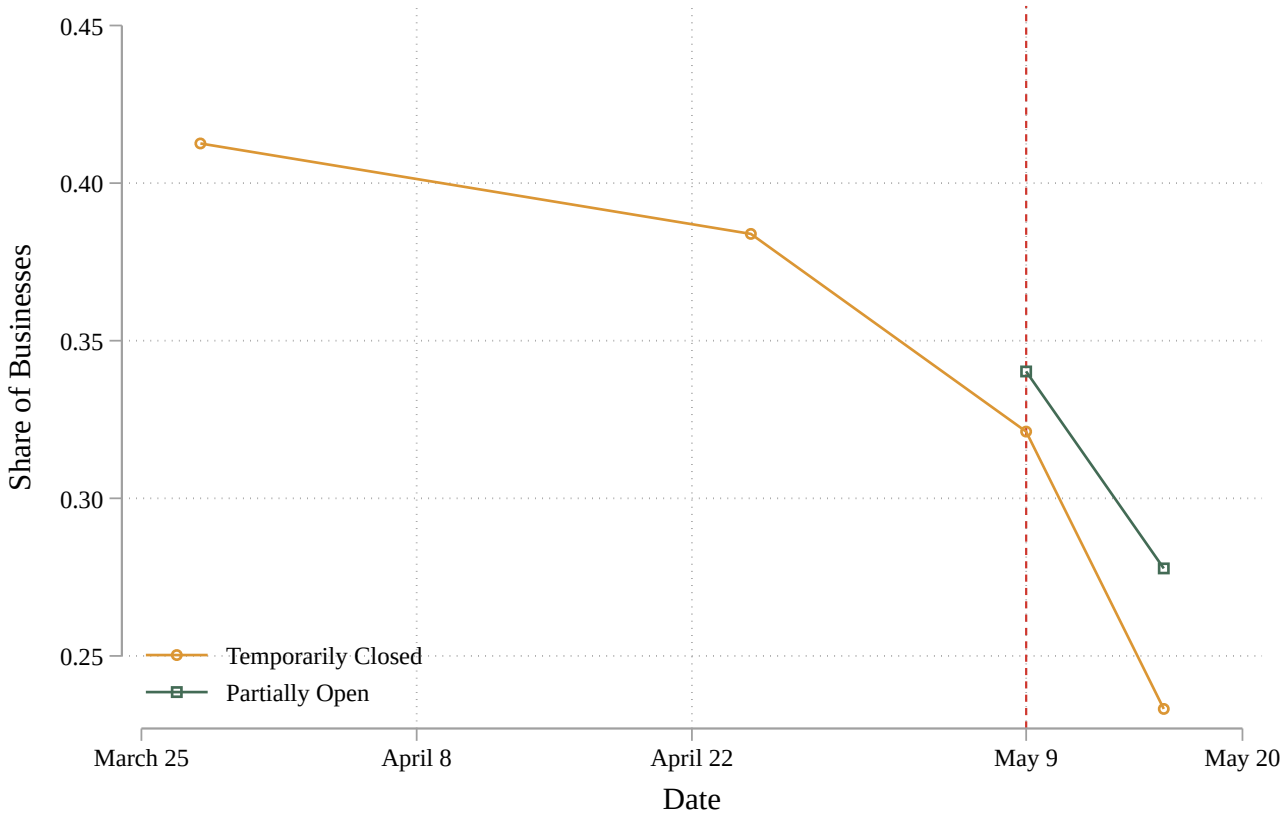


Figure 3: Shares of businesses with limited or no operations over time

This figure plots the share of firms by their operational status across waves of Alignable's data collection. Prior to the survey conducted on May 9, 2020 (the vertical line), partially open and fully open businesses were grouped together. Temporarily closed businesses are tracked consistently throughout different surveys. N=117,672 across different waves.

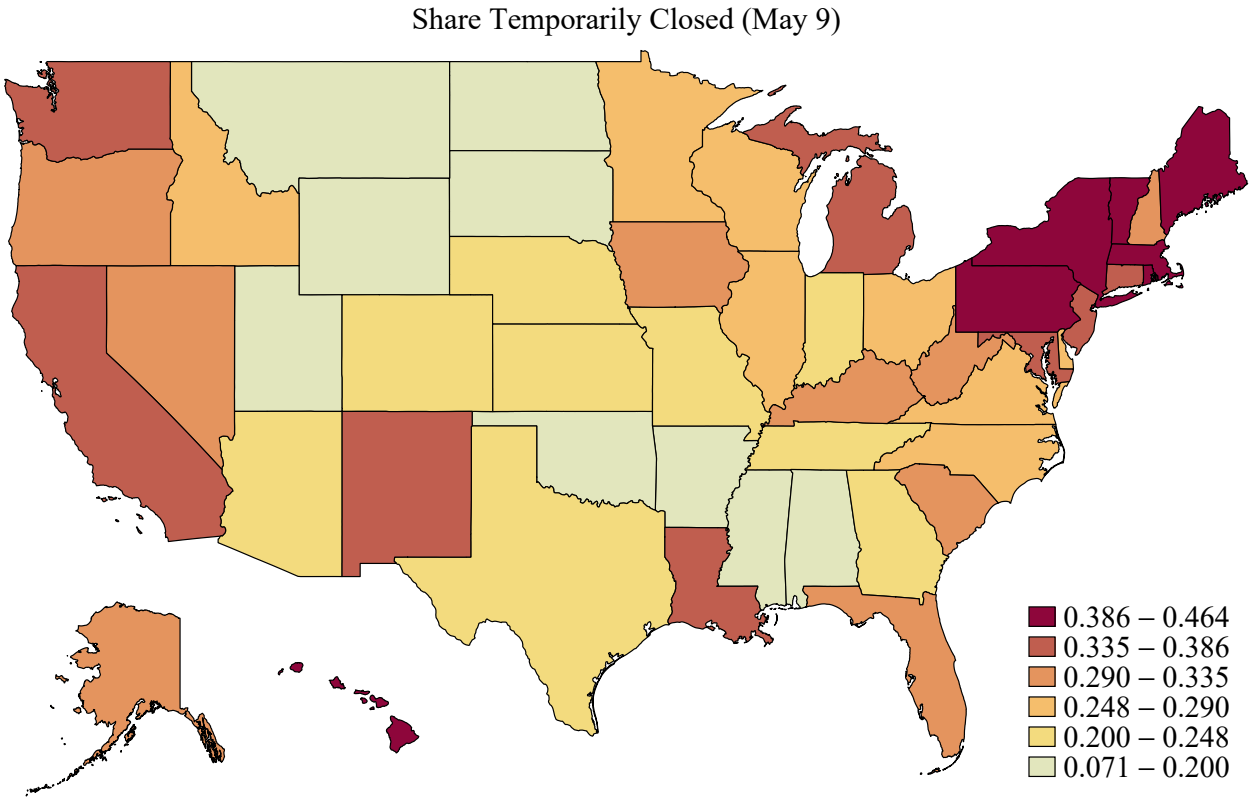


Figure 4: Shares of businesses temporarily closed by state in the May 9, 2020 survey

This figure plots the share of firms that are temporarily closed businesses as of the May 9th survey wave. N=33,001.

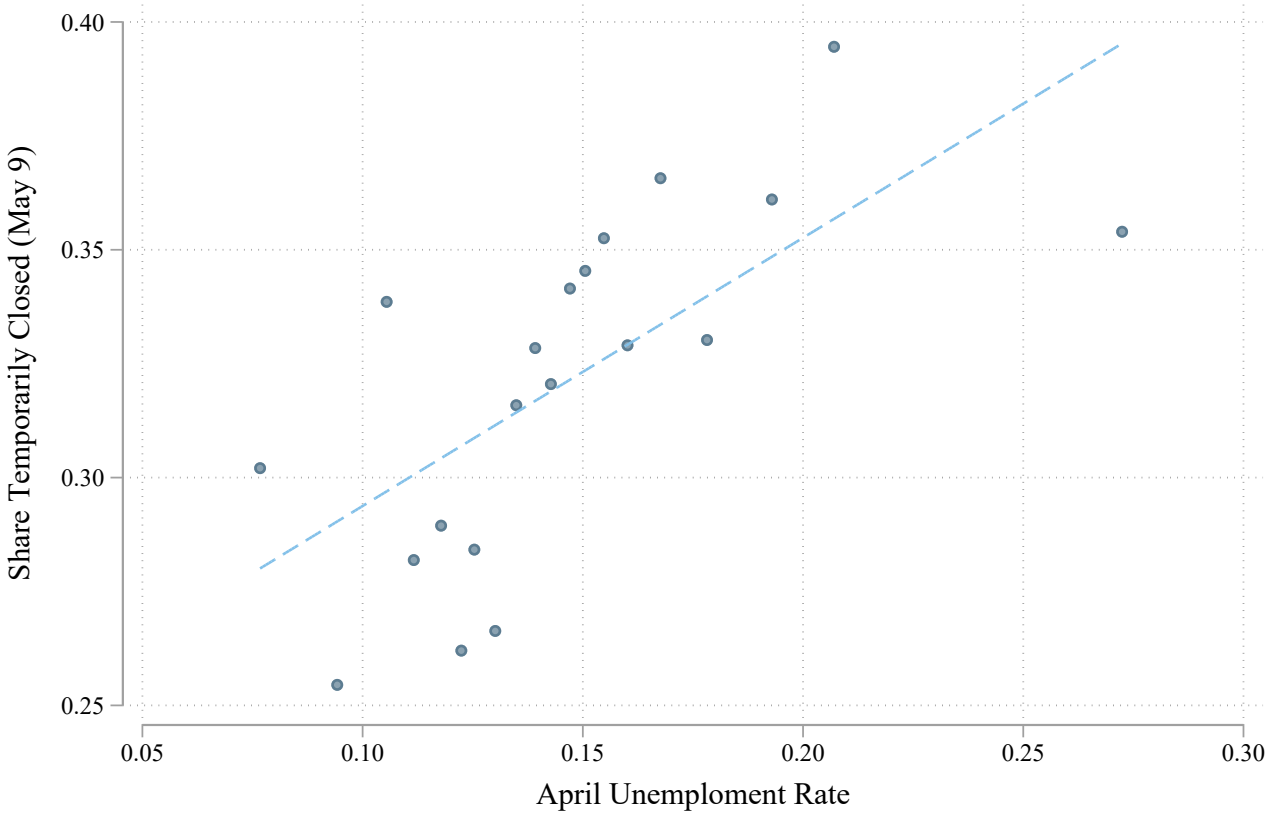


Figure 5: Shares of businesses temporarily closed and in each county and the county-level unemployment rate

This figure plots the share of firms that are temporarily closed businesses as of the May 9th survey wave against the county-level unemployment rate. N=32,763.

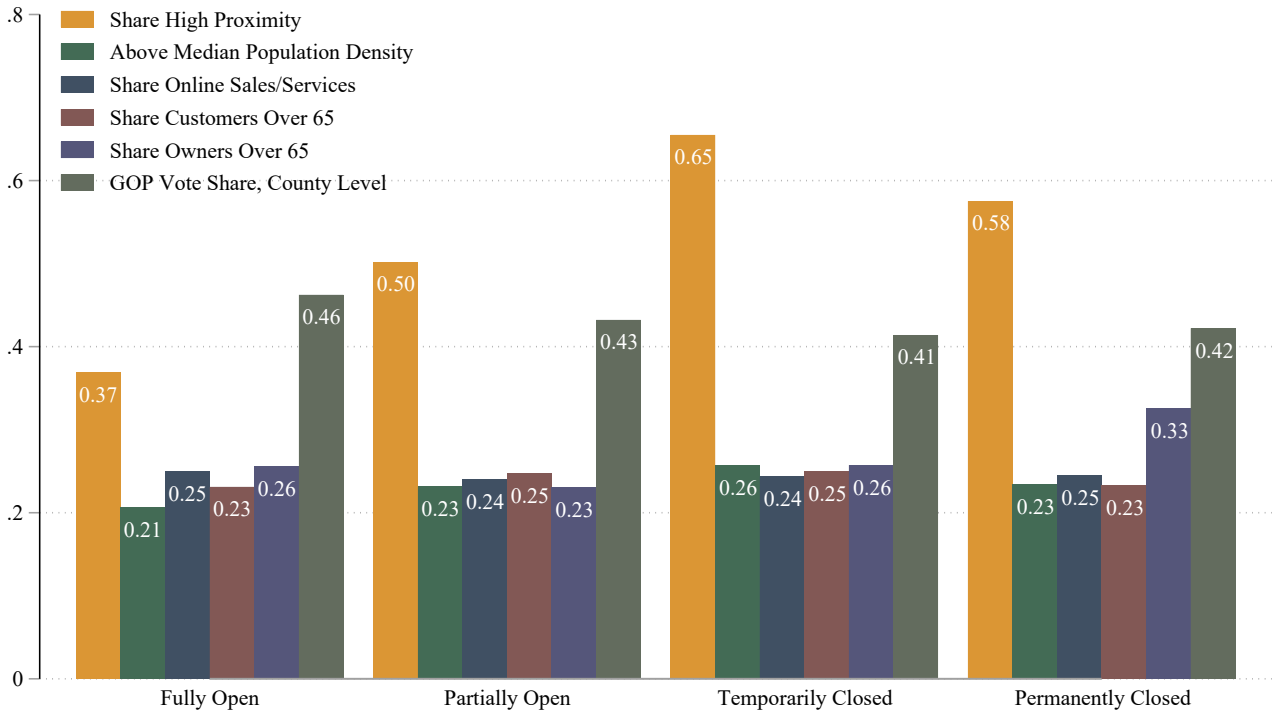


Figure 6: Characteristics of Businesses by Operational Status as of May 9, 2020

This figure plots characteristics of different businesses based on their industry characteristics, location characteristics, or owner characteristics. Bars represent means and data are grouped by the operational status of the business as reported in the May 9, 2020 survey. Please refer to Section 2 of the corresponding paper for detailed definitions of each data source represented in this graph.

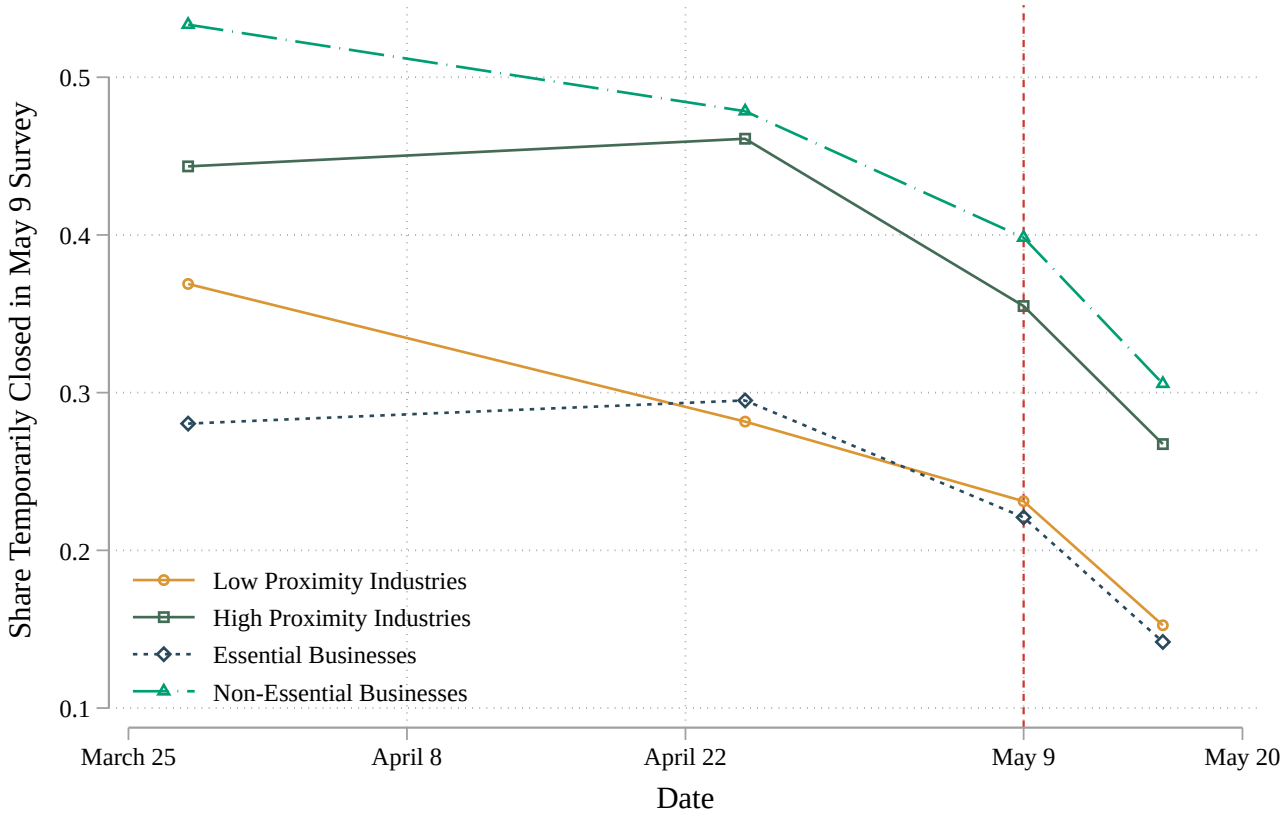


Figure 7: Shares of Businesses that are Temporarily Closed based on Above and Below Median Proximity and Essential and Non-Essential Industry Classifications

This figure plots the share of firms that are temporarily closed across waves of Alignable's data collection, split by whether the business is in an above or below median proximity industry. Proximity is defined by the O-NET Physical Proximity measure "To what extent does this job require the worker to perform job tasks in close physical proximity to other people?" We merge the proximity measure to the OES data based on occupation and then take an employment-weighted average by industry. We thank Simon Mongey and Alex Weinberg for publicly sharing this measure. Industries are classified as essential if they are on the list of essential NAICS codes in both Delaware and Minnesota, two states that have done this classification based on NAICS industries.

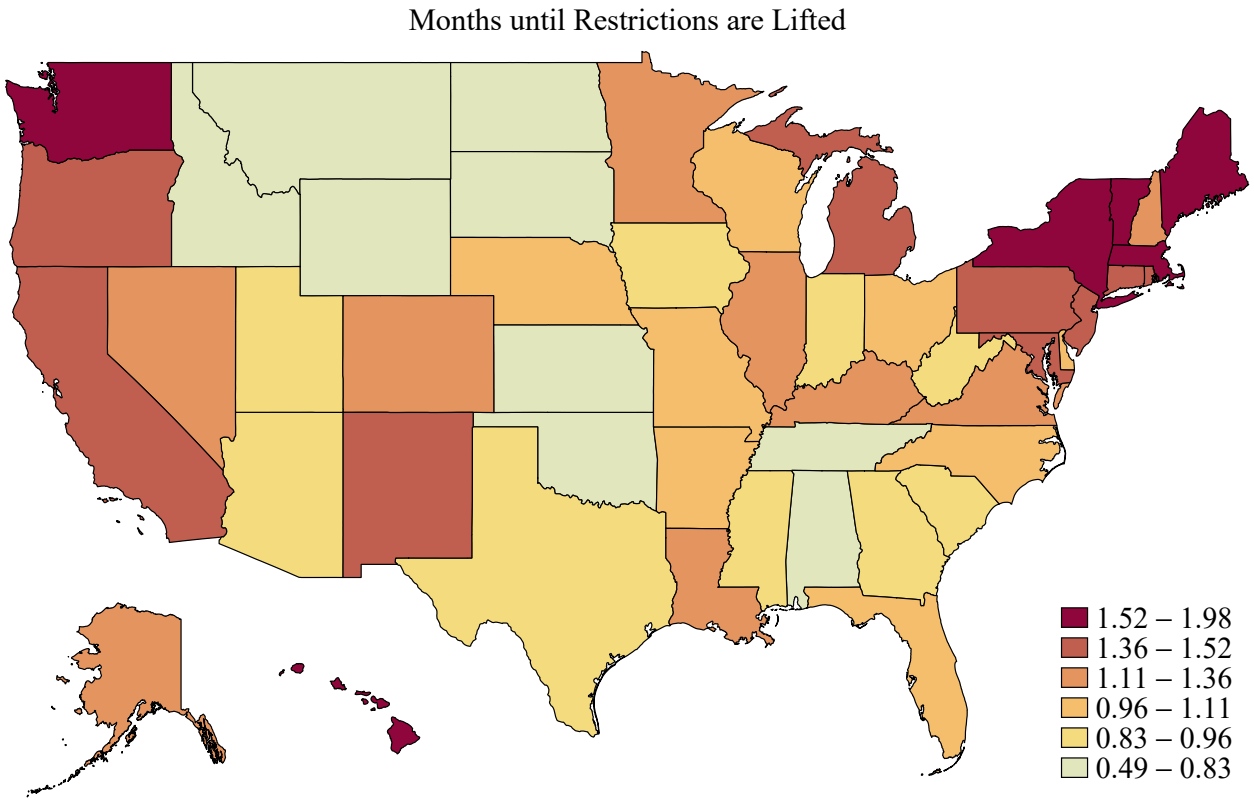


Figure 8: Average of Respondent's Perceived Months Until Restrictions Lifted, by State

This figure plots the average of respondents' perceived number of months until legal restrictions on businesses' ability to fully reopen will be lifted. Fully open businesses are included and take a value of 0.

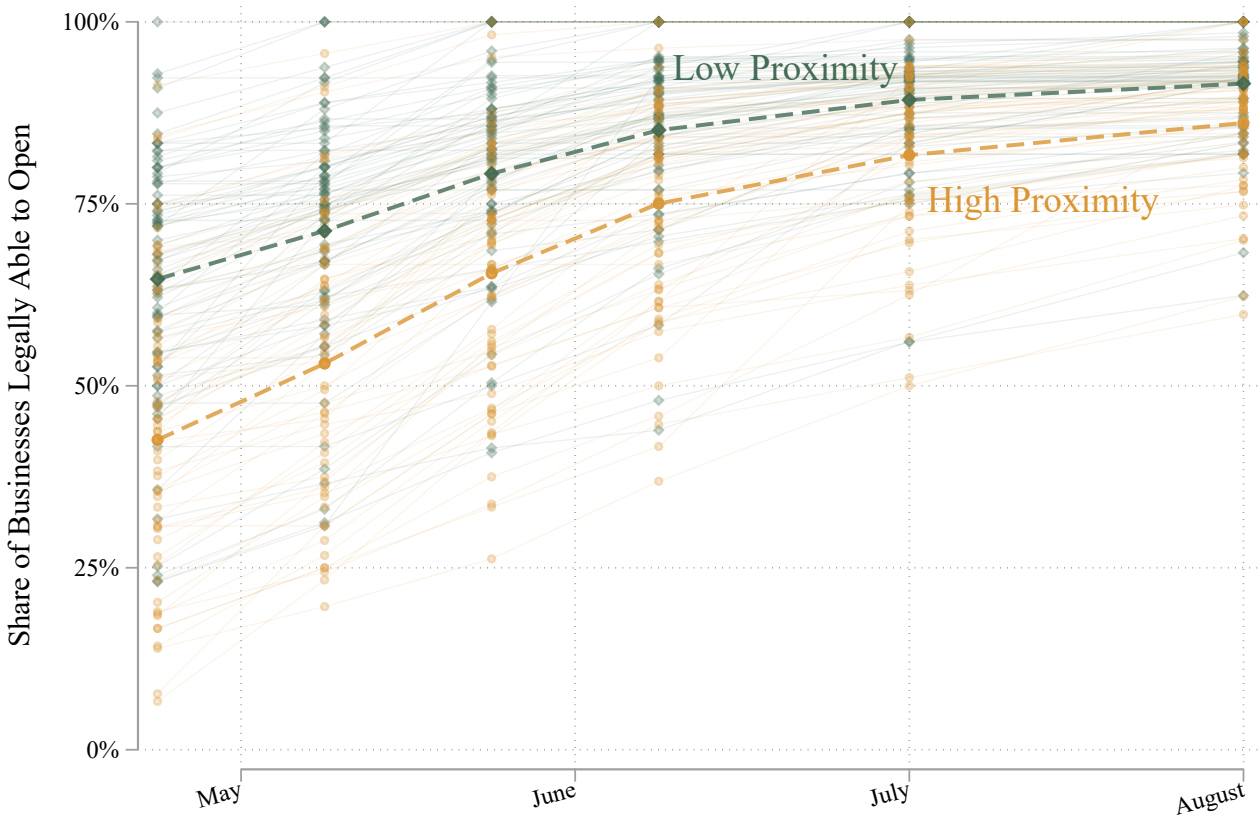
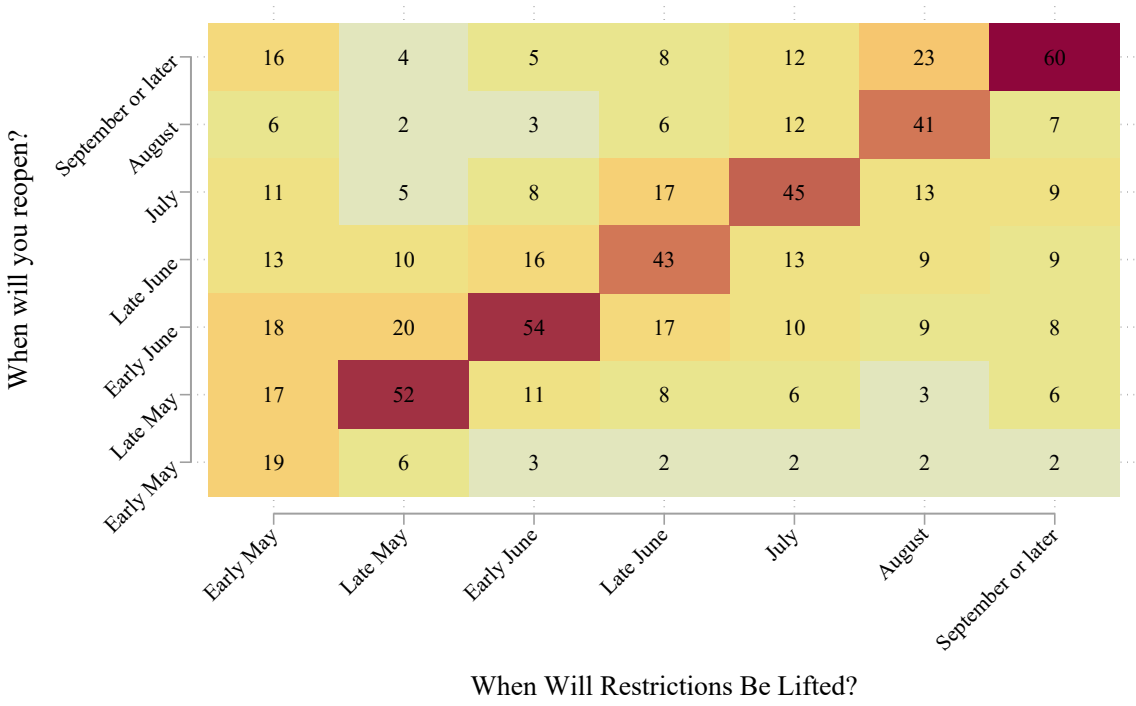


Figure 9: Average Share of Businesses Expecting to be Legally Able to Reopen by Different Dates

This figure plots the distribution function by industry of respondents' perceived number of months until legal restrictions on businesses' ability to fully reopen will be lifted. Fully open businesses are included and take a value of 0. High proximity businesses, in yellow, are those above the median according to the proximity score. Green indicates low proximity businesses.



The percent of respondents in each cell is displayed, normalized within columns. Due to rounding, columns may not sum to 100.

Figure 10: Patterns in regulation and reopening at the individual business level

This figure displays when each business owner expects easing of legal restrictions around "fully reopening" (x-axis) and the expected date when they will "fully reopen" (y-axis). The x-axis is derived from the question "If there are legal restrictions on fully reopening your business, when do you expect them to be lifted?". Response possibilities ranged from "There are no legal restrictions." to "September or later". The y-axis is derived from the question "When will your business be fully open? Please provide your best guess." Responses possibilities ranged from "Early May" to "September or later". Businesses that were fully open were not asked the question and are coded as 0. Numbers in each cell are percent of responses within column.

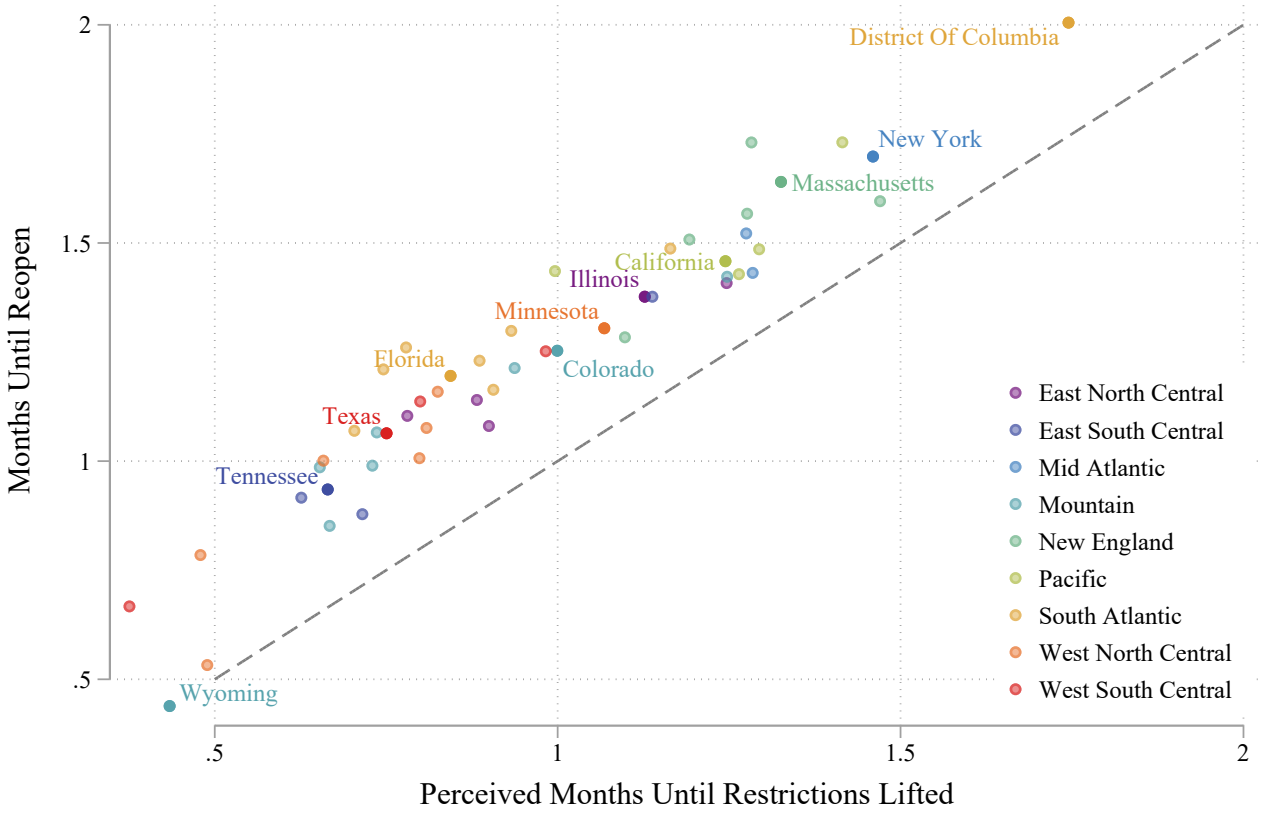


Figure 11: Average Months Until Restrictions To Open Are Lifted and Expected Months Until Fully Open

This figure plots averages of respondents' estimated months to fully reopen (y-axis) against the state-level averages of respondents' perceived number of months before legal restrictions preventing "fully reopening" are lifted (x-axis). The y-axis is derived from the question "When will your business be fully open? Please provide your best guess." Responses possibilities ranged from "Early May" to "September or later". Businesses that were fully open were not asked the question and are coded as 0. The x-axis is derived from the question "If there are legal restrictions on fully reopening your business, when do you expect them to be lifted?". Response possibilities ranged from "There are no legal restrictions" to "September or later".

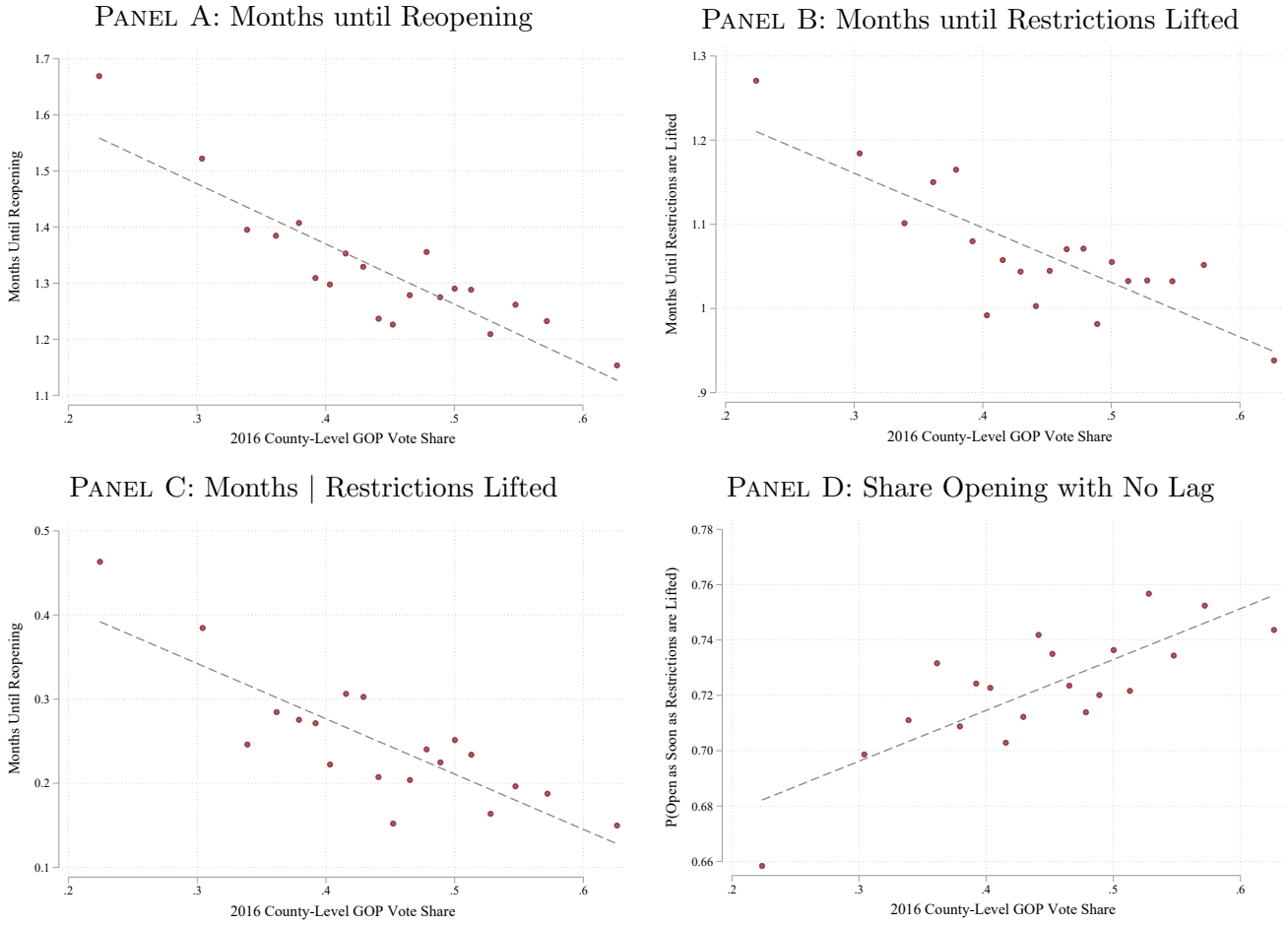


Figure 12: Effect of 2016 GOP Vote Share on Projected Time to Reopen and Time until Restrictions Lifted

The x-axis in every panel is the county-level GOP vote share in the 2016 Presidential election. Panel A plots the projected months until the business reopens. Panel B plots the projected months until restrictions are lifted. Panel C replicates Panel A, but nets out fixed effects for projected months until restrictions are lifted. Panel D plots the share of respondents who selected the same period for projected reopening date and the projected date by which restrictions will be lifted. All plots contain state and 4-digit NAICS fixed effects, and control for population, population density and COVID cases (all control variables have been transformed by the natural logarithm).

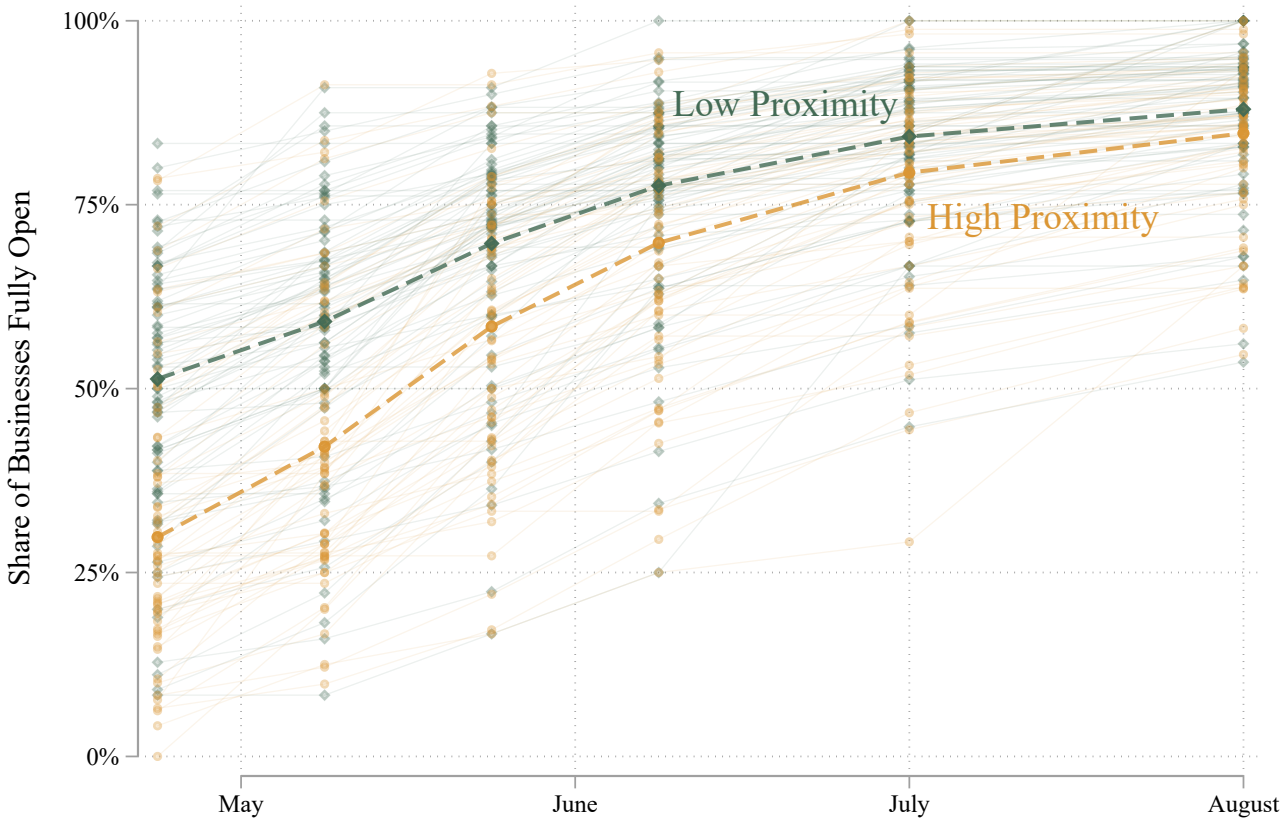


Figure 13: Average Share of Businesses Projected to Be Fully Open in Each Industry by Date

This figure plots the average share of businesses fully open or projected to be fully open at future dates. Each line represents a 4-digit NAICS code and is constructed using the cumulative distribution of individual responses to the question "When will your business be fully open? Please provide your best guess." Line colors correspond to whether the industry is above or below the median of the proximity measure, with high (yellow) and low (green). Industries graphed have more than 20 observations. The average graphed includes all observation.

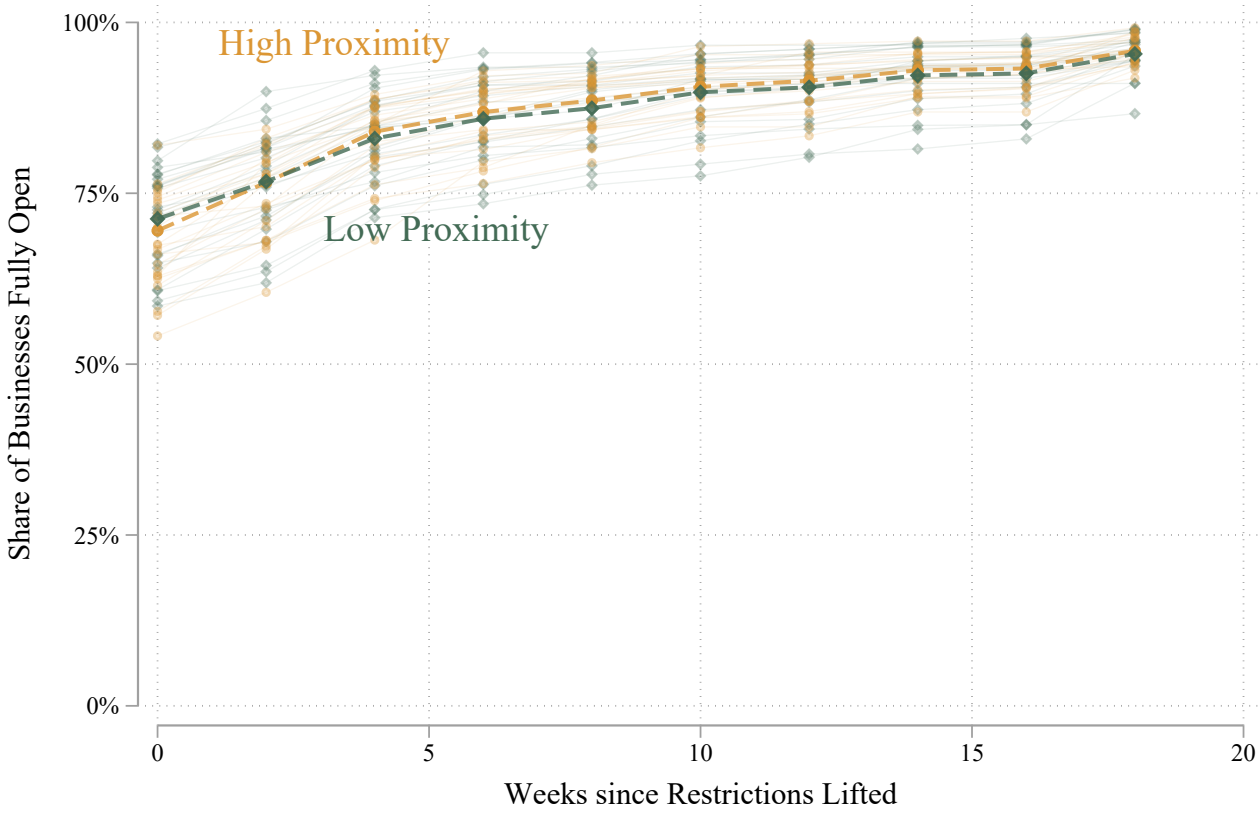


Figure 14: Average Share of Businesses Reopening in Each Industry, Represented as Elapsed Weeks after Restrictions are Lifted

This figure plots the lag time in reopening between when respondents plan to reopen and when they are legally allowed to do so. This is calculated as the difference between respondents' projected reopening date and their perceived date by which legal restrictions on operations will be lifted. Businesses that are fully open are included at 0.

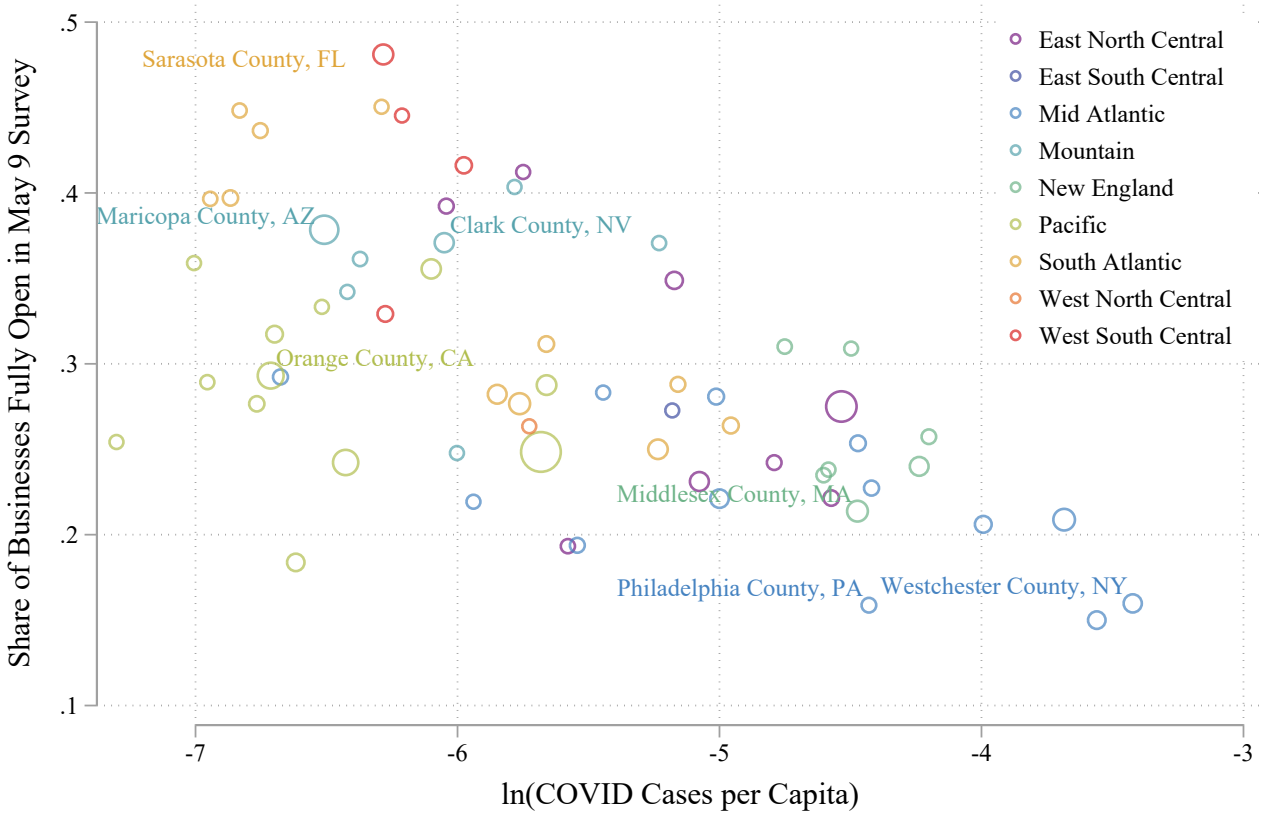


Figure 15: Share of Small Businesses Open and COVID Cases, by county

Each point is a county-level average; counties with fewer than 110 observations are excluded.

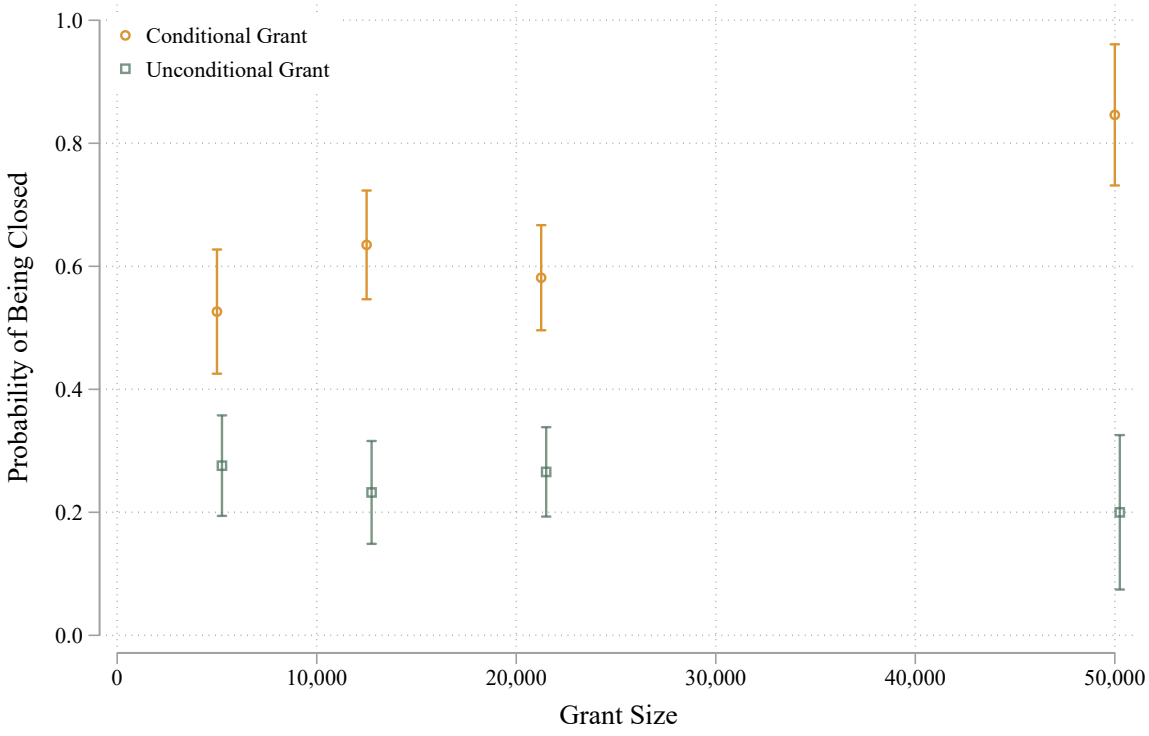


Figure 16: Estimates of how cash on hand and conditional cash on hand change the decision to remain closed

This figure plots how answers to a question about willingness to stay closed over the next 2 weeks changes as a function of different hypothetical amounts of cash on hand. This is captured by "grant size" on the x-axis, which comes from two parallel questions. Half of respondents (Unconditional Grant) were asked "Suppose we could extend you a cash grant of [Grant Size]. Would you choose to open over the next two weeks?" The other half of respondents (Conditional Grant) were asked "Suppose we could extend you a cash grant of [Grant Size] but only on the condition that you remained closed for the next two weeks. Would you choose to open over the next two weeks instead of taking the cash grant?" The sample for this figure comes from the first wave of a panel survey of Alignable users conducted through Harvard Business School between May 20, 2020 and May 28, 2020 (N=780).

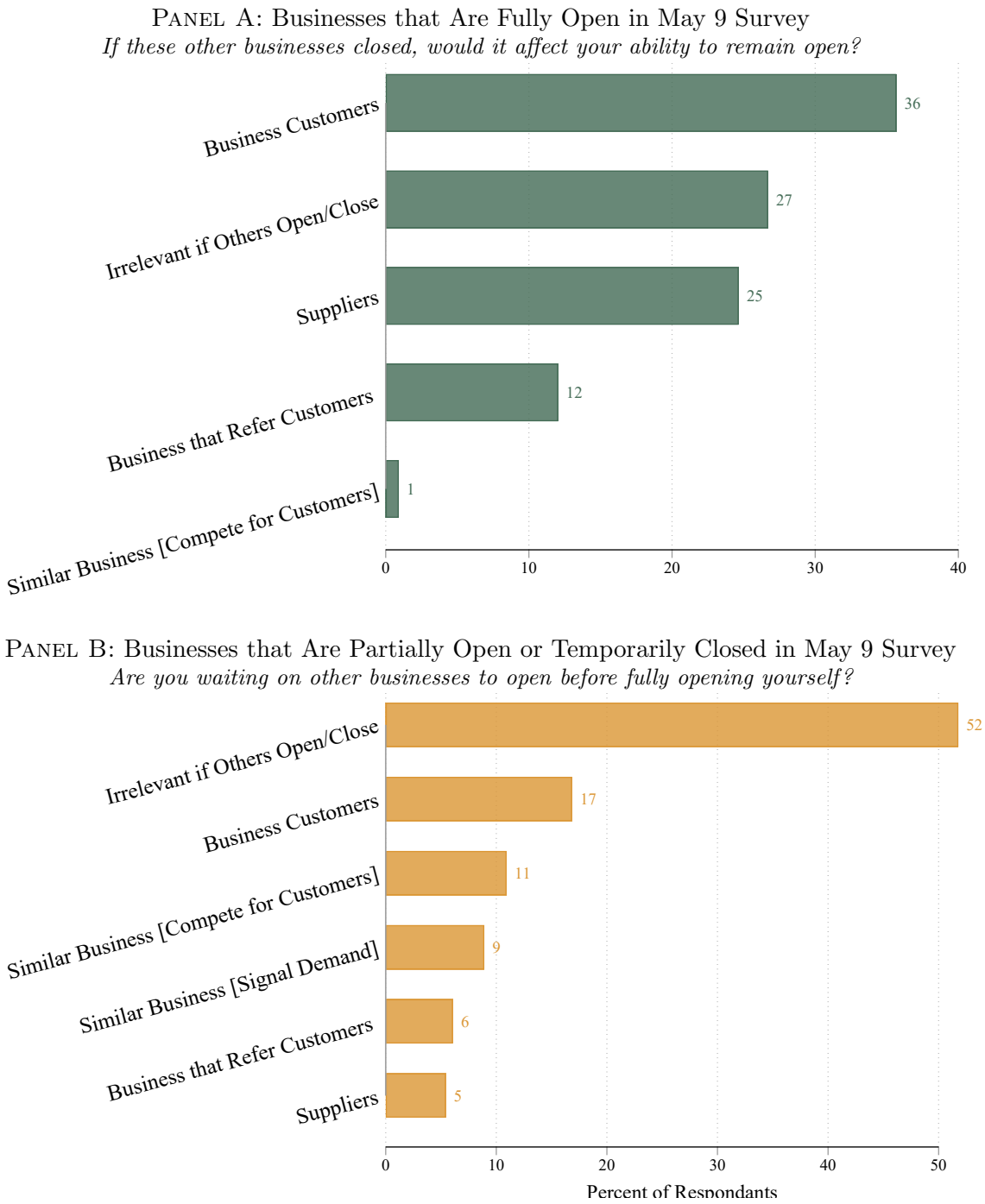


Figure 17: Reopening decisions as a function of other businesses' actions

This figure displays patterns of business dependency. Partially open or temporarily closed were asked "Are you waiting on other businesses to open before fully opening yourself? (Select the category that matters most.)." Fully open businesses were asked "Although you are currently open, if these other businesses closed, would it affect your ability to remain open? (Select the category that matters most.)".

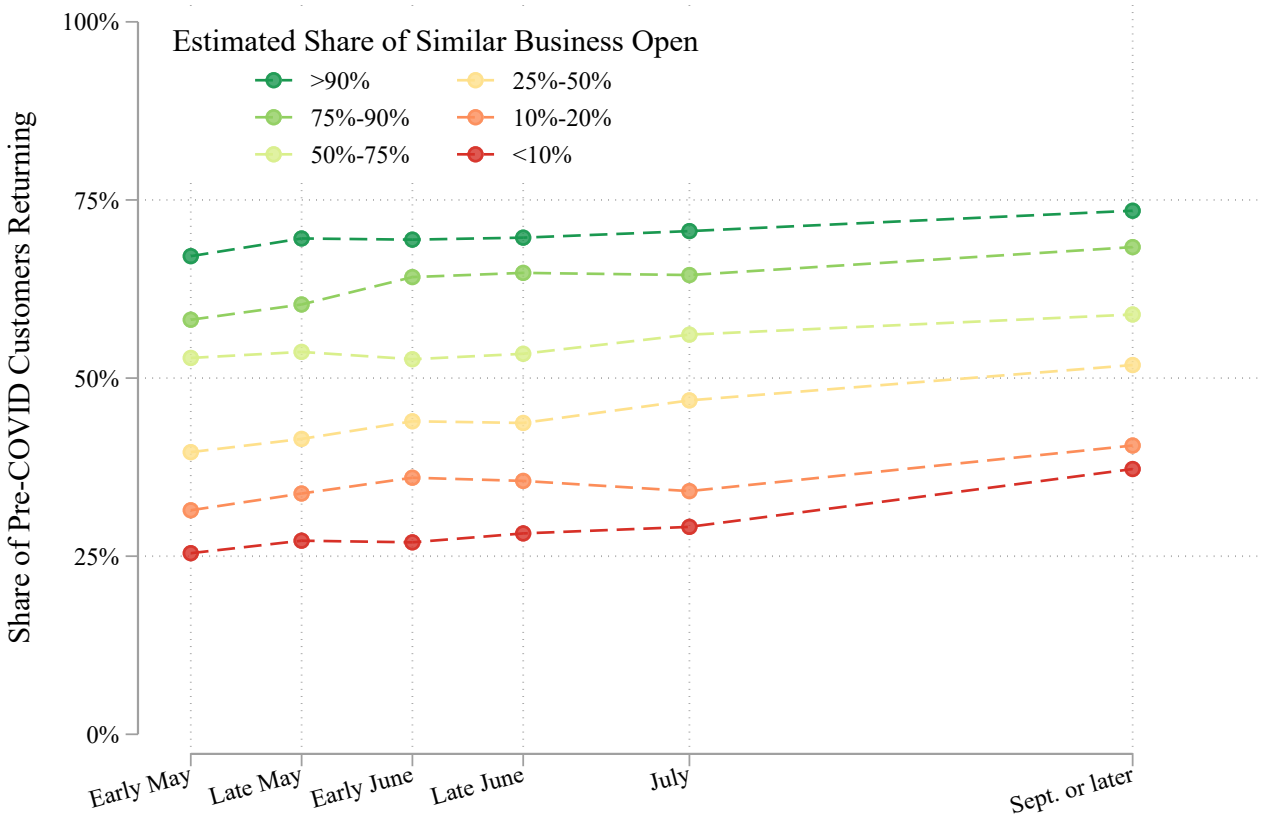


Figure 18: Reopening patterns and customer demand

This figure plots estimated shares of customers relative to pre-covid customers across different dates, split out by the respondents' estimated share of similar businesses open. Each respondent was asked about the share of their own customers and the expected share of similar businesses to their own that would be open by a particular date in the future (x-axis). Respondents were asked about different dates at random to trace out patterns of demand over time. Each dot represents the aggregation after between subject randomization of dates.

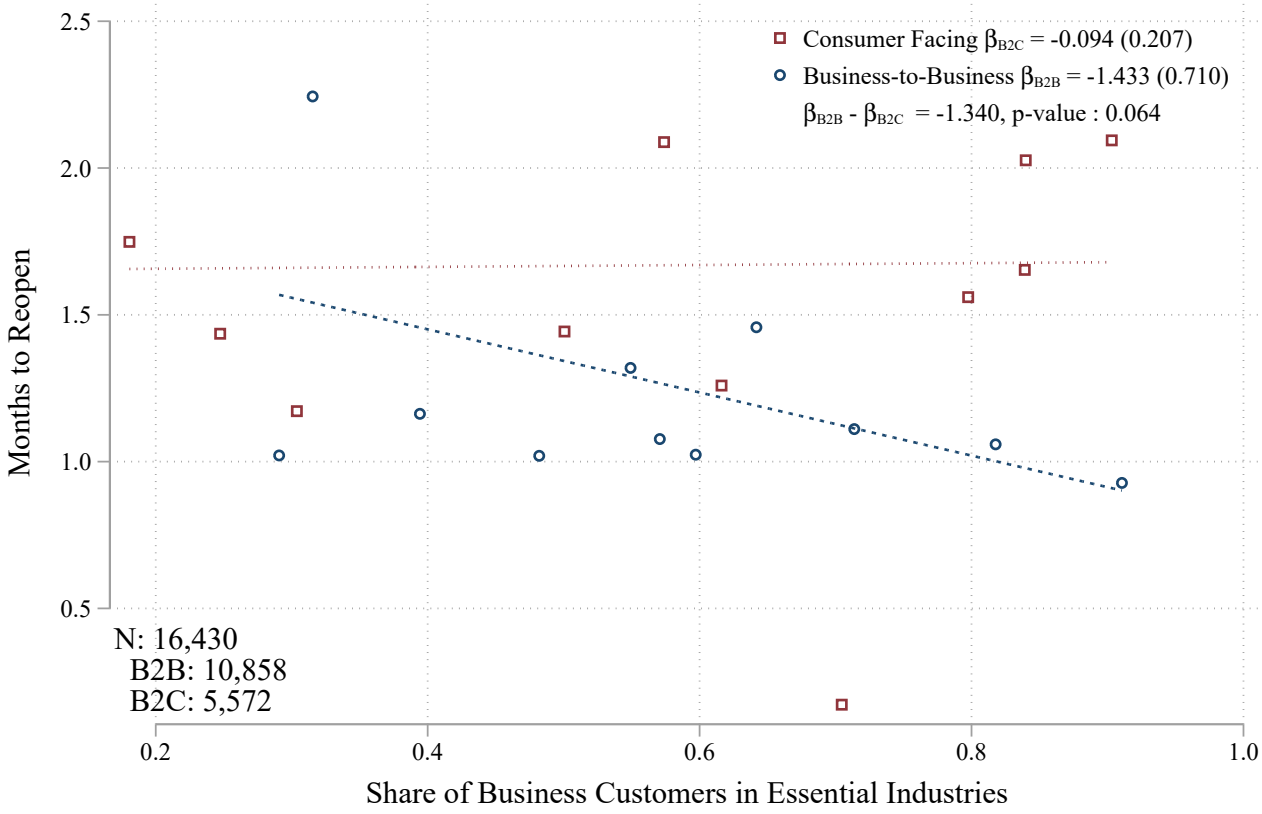


Figure 19: Time to Reopen and Share of Business Buyers Classified as Essential

This figure combines the BEA Input/Output Supply table with essential business classifications from Minnesota and Delaware to identify the share of downstream businesses for each NAICS code that are in industries categorized as essential (x-axis). The y-axis is the projected months until the small business can fully reopen. The series are split by taking the shares of industry output that goes to business buyers as intermediate good and to private household consumption. Industries at the 33th percentile or lower ($\leq$ 30% B2B output) are coded as consumer facing. Coefficients are estimated in regressions with an indicator for whether the business itself is in an essential industry, and standard errors are clustered at the 3-digit NAICS level, which is the level at which the BEA data are available.

Table 1: Summary Statistics on Data from Survey and Additional Sources

Panel A: Data from Alignable Survey

	Mean	Std. Dev.	25th P'tile	75th P'tile	min/max	Obs.
Mo. until Reopen	1.3245	1.4882	0	1.75	0–4.5	28,981
Mo. until No Restrictions	1.0616	1.4159	0	1.75	0–4.5	28,443
Lag $\geq$ 4wks	0.1772	0.3819	0	0	0–1	28,220
Share Returning Customers	54.0190	29.4187	37.5	82.5	5–95	27,263
N. Employees (Jan, 2020)	10.6323	32.7679	1	7	0–500	20,492
Fully Open in May 9 Survey	0.3158	0.4649	0	1	0–1	33,001
Partially Open in May 9 Survey	0.3401	0.4737	0	1	0–1	33,001
Temporarily Closed in May 9 Survey	0.3218	0.4672	0	1	0–1	33,001
Permanently Closed in May 9 Survey	0.0223	0.1477	0	0	0–1	33,001
P(Open in December)	0.7844	0.1955	.609	.94	.133–.94	17,098

Panel B: Data from Additional Sources

	Mean	Std. Dev.	25th P'tile	75th P'tile	min/max	Obs.
COVID Cases per cap.	0.0045	0.0058	0.0011	0.0053	0.0000–0.0715	32,079
Emp. Physical Proximity	3.4792	0.4363	3.0806	3.8303	2.1565–4.4185	19,058
Likelihood Customers Over 65	24.2701	13.9077	12.5000	30.5000	5.0000–87.5000	22,728
Ease Operating Online	24.4718	14.9936	10.0000	37.0000	5.0000–65.0000	22,728
Essential Business (DE & MN)	0.5305	0.4991	0.0000	1.0000	0.0000–1.0000	22,755
GOP Vote Share (County)	0.4357	0.1557	0.3331	0.5463	0.0412–0.8985	32,763
Share Output $\rightarrow$ Intermed. Input	0.5342	0.3519	0.1470	0.9067	0.0002–1.0000	18,124
Share Business Buyers in Essential Ind.	0.5492	0.3006	0.3250	0.7319	0.0000–1.0000	20,872

Note: Panel A presents summary statistics for survey responses. "Mo. until Reopen" and "Mo. until No Restrictions" are the perceived months until the business will be fully open, and the perceived months until it is legal to fully open, respectively. These figures are relative to the survey date of May 9. Responses were topcoded at "September or Later", which we top code at 4.5 months from early May. "N. Employees (Jan, 2020)" is the self reported number of employees, including the respondent, in January 2020. The four indicator variables regarding current status as of the May 9 survey correspond to the four options of the first question asked to respondents. For this reason, these variables have the most observations. "P(Open in December)" is the numeric probability that a businesses remains open in December, 2020. We code these probabilities from a multiple choice question shown to respondents. This is the last question in the survey, which accounts for the fact that this variable has the fewest responses.text provides more detail about survey completion rates. par Panel B presents summary statistics for data taken from outside sources. "COVID Cases per cap." is the county-level number of COVID cases per capita. "Emp. Physical Proximity" is the the weighted average of a 5 point occupational proximity scale over the industry-level (4-digit NAICS) distribution of occupations. "Likelihood Customers Over 65" and "Ease Operating Online" are derived from MTurk answers at the 4-digit NAICS level. (See appendix for the MTurk data collection tool.) "Essential Business (DE & MN)" is an indicator variable that indicates if a businesses was considered essential in the guidelines made available in Deleware and Minnesota. "GOP Vote Share (County)" is the share of votes for the Republican Presidential candidate in 2016. "Share Output $\rightarrow$ Intermed. Input" is derived from the BEA 2012 Use table and is the share of total 3-digit industry output that used as intermediate inputs. "Share Business Buyers in Essential Ind." is derived from the same BEA series, as well as the "Essential Business (DE & MN)" measure. This is the share of output that is used as an input by industries we identify as essential divided by the total output that is used as intermediate inputs.

Table 2: Summary Statistics by States with Stay at Home Orders in Place as-of May 9

	Temporarily Closed	Partially Open	Months Until Reopen	Months Until No Restrictions
No Stay at Home	0.272	0.338	1.384	1.083
Stay at Home	0.360	0.340	1.700	1.435

Table 3: Factors Contributing to Differences in Operational Status

	(1) Fully Open	(2) Partially Open	(3) Temp. Closed	(4) Perm. Closed
Emp. Physical Proximity	-0.1047***	-0.0159***	0.1170***	0.0036***
	(0.0039)	(0.0043)	(0.0041)	(0.0013)
Owner Age	0.0011*	-0.0010*	-0.0006	0.0004**
	(0.0006)	(0.0006)	(0.0006)	(0.0002)
Customers Over 65	-0.0085***	0.0132***	-0.0028	-0.0019*
	(0.0033)	(0.0035)	(0.0033)	(0.0010)
Essential Business	0.1193***	0.0434***	-0.1587***	-0.0040*
	(0.0063)	(0.0068)	(0.0070)	(0.0023)
Ease Operating Online	-0.0157***	-0.0085**	0.0235***	0.0007
	(0.0039)	(0.0039)	(0.0040)	(0.0010)
ln(COVID cases per cap.)	-0.0317***	0.0059**	0.0260***	-0.0002
	(0.0044)	(0.0028)	(0.0047)	(0.0008)
ln(Pop. Density)	0.0147***	-0.0042	-0.0103***	-0.0002
	(0.0039)	(0.0026)	(0.0038)	(0.0007)
GOP Vote Share (County)	0.3222***	-0.0822***	-0.2303***	-0.0097
	(0.0287)	(0.0247)	(0.0337)	(0.0066)
DV Mean	0.317	0.340	0.321	0.022
DV SD	0.465	0.474	0.467	0.147
Residual SD	0.451	0.472	0.450	0.147
R^2	0.0596	0.0059	0.0708	0.0024
N	32,763	32,763	32,763	32,763

Note: These columns correspond to answers to the question "Are you currently open?". These options are collectively exhaustive and mutually exclusive. *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors are clustered at the county level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Time to Reopen by Industry (2-digit NAICS) for firms that are not fully open

	Reopen	Lag	Lag $\geq$ 4 weeks
Accommodation and Food Services	2.241	0.461	0.204
Other Services, Except Public Administration	1.828	0.496	0.217
Management of Companies and Enterprises	0.750	0.500	0.000
Retail Trade	1.755	0.534	0.228
Arts, Entertainment, and Recreation	2.647	0.585	0.241
Finance and Insurance	1.783	0.589	0.277
Real Estate and Rental and Leasing	1.928	0.611	0.275
Construction	1.747	0.625	0.278
Educational Services	2.482	0.706	0.271
Agriculture, Forestry, Fishing and Hunting	2.034	0.711	0.311
Manufacturing	2.008	0.740	0.305
Health Care and Social Assistance	1.986	0.762	0.317
Public Administration	2.519	0.776	0.333
Utilities	1.938	0.793	0.348
Administrative and Waste Services	2.388	0.835	0.337
Wholesale Trade	1.870	0.845	0.331
Professional and Technical Services	2.154	0.872	0.356
Information	2.698	0.954	0.381
Mining, Quarrying, and Oil and Gas Extraction	1.884	1.019	0.308
Transportation and Warehousing	2.376	1.027	0.416

Table 5: OLS: Contribution of Various Factors to the Small Business Reopen Decision

	(1) Reopen	(2) Restrictions	(3) Lag	(4) Lag $\geq$ 4wk	(5) Reopen	(6) Restrictions	(7) Lag	(8) Lag $\geq$ 4wk
	All Businesses				*Excluding Fully Open Businesses*			
ln(COVID cases per cap.)	0.0813***	0.0812***	0.0219***	0.0055*	0.0211*	0.0444***	0.0101	-0.0003
	(0.0125)	(0.0127)	(0.0077)	(0.0030)	(0.0111)	(0.0128)	(0.0098)	(0.0037)
Emp. Physical Proximity	0.2556***	0.3068***	0.0457*	0.0128	0.0195	0.1177*	-0.0189	-0.0060
	(0.0542)	(0.0654)	(0.0273)	(0.0109)	(0.0486)	(0.0621)	(0.0353)	(0.0106)
× ln(COVID cases p.c.)	0.0034	0.0015	0.0037	0.0006	0.0072	-0.0049	0.0066	0.0023
	(0.0089)	(0.0106)	(0.0047)	(0.0018)	(0.0082)	(0.0103)	(0.0061)	(0.0018)
Owner Age	-0.0014	-0.0063***	0.0031	0.0007	0.0009	-0.0068**	0.0028	0.0004
	(0.0026)	(0.0024)	(0.0022)	(0.0007)	(0.0028)	(0.0030)	(0.0025)	(0.0008)
× ln(COVID cases p.c.)	0.0002	-0.0002	0.0003	0.0001	0.0002	-0.0003	0.0002	0.0000
	(0.0002)	(0.0003)	(0.0002)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0001)
Customers Over 65	-0.1135***	-0.0908	-0.0498	-0.0073	-0.0709*	-0.0462	-0.0722**	-0.0139
	(0.0377)	(0.0566)	(0.0316)	(0.0100)	(0.0405)	(0.0678)	(0.0313)	(0.0124)
× ln(COVID cases p.c.)	-0.0124**	-0.0068	-0.0075	-0.0021	-0.0012	0.0063	-0.0068	-0.0021
	(0.0063)	(0.0091)	(0.0051)	(0.0016)	(0.0070)	(0.0111)	(0.0053)	(0.0022)
Essential Business	-0.3010***	-0.3267***	-0.0720***	-0.0265***	-0.1222***	-0.2291***	-0.0488**	-0.0186***
	(0.0226)	(0.0232)	(0.0170)	(0.0056)	(0.0277)	(0.0304)	(0.0216)	(0.0067)
Ease Operating Online	0.0451***	0.0275**	0.0252**	0.0048	0.0226	0.0068	0.0256*	0.0031
	(0.0128)	(0.0119)	(0.0107)	(0.0034)	(0.0151)	(0.0158)	(0.0132)	(0.0042)
ln(Pop. Density)	-0.0430***	-0.0471***	-0.0100	-0.0024	-0.0180*	-0.0358***	-0.0071	-0.0006
	(0.0106)	(0.0113)	(0.0062)	(0.0021)	(0.0102)	(0.0118)	(0.0088)	(0.0029)
GOP Vote Share (County)	-1.3072***	-1.0771***	-0.5805***	-0.1707***	-0.9999***	-0.8412***	-0.6130***	-0.1573***
	(0.0847)	(0.0940)	(0.0600)	(0.0211)	(0.0893)	(0.1063)	(0.0791)	(0.0264)
Restriction FE	No	No	Yes	Yes	No	No	Yes	Yes
DV Mean	1.306	1.051	1.306	0.177	2.073	1.669	2.073	0.280
DV SD	1.487	1.408	1.487	0.381	1.386	1.455	1.386	0.449
Residual SD	1.451	1.368	1.116	0.375	1.372	1.439	1.160	0.379
R^2	0.0484	0.0567	0.4366	0.0329	0.0194	0.0227	0.2993	0.2884
N	28,034	28,034	28,034	28,034	17,659	17,659	17,659	17,659

Note: *Reopen* is the expected months to reopen. *Restriction* is the estimated months until restrictions are lifted. *Lag* takes the same outcome as Reopen, but adds a fixed effect for *Restriction*. *Lag* $\geq$ *4wk* is a indicator variable that evaluates to 1 if the firm's estimated reopening date is at least one month/four weeks after the estimated date restrictions are lifted. Businesses that were permanently closed at the time of the survey are excluded from these regressions; businesses that were fully open at the time of the survey are excluded from columns $5-8$. *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors in parentheses, clustered at county level. Note that the survey questions in which reopening and restriction beliefs are elicited is mid-way through the survey, thus in some columns we are able to have more observations than we have complete survey responses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Expected Demand By Industry (NAICS 2-DIGIT)

Industry	May		June		July		September		N
Share Expecting	>90%	Mean	>90%	Mean	>90%	Mean	>90%	Mean	
Arts, Entertainment, & Recreation	0.07	0.37	0.07	0.43	0.07	0.44	0.11	0.55	1851
Educational Services	0.08	0.47	0.07	0.47	0.11	0.53	0.13	0.60	832
Accommodation & Food Services	0.02	0.42	0.05	0.48	0.06	0.50	0.14	0.58	1452
Retail Trade	0.10	0.51	0.13	0.55	0.15	0.57	0.17	0.64	3057
Admin. and Waste Services	0.14	0.47	0.13	0.48	0.18	0.51	0.18	0.60	1085
Real Estate & Leasing	0.14	0.54	0.16	0.57	0.20	0.60	0.20	0.61	2162
Information	0.15	0.53	0.19	0.57	0.22	0.59	0.20	0.65	586
Manufacturing	0.12	0.56	0.14	0.60	0.13	0.59	0.21	0.67	1744
Health Care & Social Assistance	0.07	0.55	0.13	0.58	0.15	0.61	0.22	0.70	2331
Professional & Technical Services	0.18	0.54	0.18	0.58	0.19	0.62	0.24	0.67	3985
Other Services, Except Public Admin.	0.12	0.54	0.15	0.58	0.16	0.60	0.24	0.68	2322
Construction	0.17	0.59	0.18	0.60	0.19	0.63	0.25	0.69	1998
Finance and Insurance	0.19	0.66	0.28	0.66	0.26	0.65	0.27	0.70	1629

Notes. This table reports answers to a question about the expected share of customers returning by a certain randomly chosen date in the future. Each cell reports a share of customers relative to pre-COVID customers conditional on being able to classify industries. Columns are the share of respondents who report having greater than 90% of pre-COVID customers (the highest category) and then mean share of pre-COVID customers using the mid-point of categorical answers.

Table 7: Contribution of Various Factors to Projected ln(Share Returning Customers)

	(1) *All Businesses*	(2) *Excluding Fully Open Businesses*
Mo. until No Restrictions	-0.1739***	-0.1296***
	(0.0044)	(0.0051)
ln(COVID cases per cap.)	-0.0063	-0.0016
	(0.0065)	(0.0080)
Emp. Physical Proximity	-0.0785***	-0.0840***
	(0.0238)	(0.0233)
× ln(COVID cases p.c.)	-0.0114***	-0.0175***
	(0.0039)	(0.0040)
Owner Age	0.0001	-0.0007
	(0.0014)	(0.0018)
× ln(COVID cases p.c.)	-0.0001	-0.0001
	(0.0001)	(0.0002)
Customers Over 65	0.0628**	0.0530*
	(0.0270)	(0.0281)
× ln(COVID cases p.c.)	0.0069	0.0033
	(0.0044)	(0.0048)
Essential Business	0.1217***	0.1110***
	(0.0118)	(0.0150)
ln(Pop. Density)	0.0150**	0.0178**
	(0.0059)	(0.0076)
Ease Operating Online	-0.0382***	-0.0409***
	(0.0069)	(0.0089)
GOP Vote Share (County)	0.4473***	0.4952***
	(0.0482)	(0.0608)
DV Mean	3.727	3.557
DV SD	0.876	0.921
Residual SD	0.798	0.844
R^2	0.1694	0.1608
N	26,784	17,880

Note: The outcome in all columns is the logarithm of projected demand, measured as the answer to the question "If you are fully open by *randomized date*, what share of your customers do you expect at that time, compared to before the crisis? Please provide your best guess". *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors in parentheses, clustered at county level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Instrumenting Expected Customer Demand: Information Treatment

Panel A: 2SLS

	(1) Reopen	(2) Reopen†	(3) Lag	(4) Lag†	(5) Lag ≥ 4wk	(6) Lag ≥ 4wk†	(7) Open Dec.	(8) Open Dec.†
ln(Share Customers Returning)	-0.881***	-0.860***	-0.531**	-0.533**	-0.168**	-0.155*	0.318***	0.333***
	(0.187)	(0.194)	(0.217)	(0.211)	(0.084)	(0.083)	(0.043)	(0.044)
Restriction FE	No	No	Yes	Yes	Yes	Yes	No	No
Additional Controls	No	Yes	No	Yes	No	Yes	No	Yes
Kleibergen-Paap F stat	8.3	9.4	8.3	9.3	8.3	9.3	9.0	10.2
Mean Dep. Var.	1.38	1.38	0.19	1.37	0.19	0.19	0.79	0.79
Std. Dev. Dep. Var.	1.49	1.49	0.39	1.49	0.39	0.39	0.18	0.18
R^2	0.70	0.70	0.79	0.79	0.46	0.47	0.90	0.90
Observations	16,275	16,275	16,183	16,183	16,183	16,183	13,391	13,391

Panel B: First-Stage and Reduced Form

	First Stage		Reduced Form							
	(1) Demand	(2) Demand†	(3) Reopen	(4) Reopen†	(5) Lag	(6) Lag†	(7) Lag ≥ 4wk	(8) Lag ≥ 4wk†	(9) Open Dec.	(10) Open Dec.†
ln(Signal/Prior) × Shown Info	0.190***	0.188***	-0.237***	-0.234***	-0.144**	-0.145***	-0.042*	-0.039*	0.083***	0.085***
	(0.045)	(0.042)	(0.049)	(0.045)	(0.055)	(0.050)	(0.023)	(0.021)	(0.006)	(0.005)
Restriction FE	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Additional Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean Dep. Var.	3.72	3.72	1.38	1.38	1.37	1.37	0.19	0.19	0.79	0.79
Std. Dev. Dep. Var.	0.87	0.87	1.49	1.49	1.49	1.49	0.39	0.39	0.18	0.18
R^2	0.34	0.34	0.52	0.52	0.63	0.63	0.39	0.39	0.10	0.10
Observations	16,275	16,275	16,275	16,275	16,183	16,183	16,183	16,183	13,391	13,391

Note: In Panel A, the dependent variable in Col. (1,2) *Reopen* is the expected months to reopen. The dependent variable in Col. (3,4) *Lag* is the same outcome (that is, months until reopening), but includes a fixed effect for the date restrictions are lifted. In Col. (5,6) *Lag ≥ 4wk* is a indicator variable that evaluates to 1 if the firm's estimated reopening date is at least one month/four weeks after the estimated date restrictions are lifted. In Col. (7,8) the dependent variable *Open Dec.* is the self-reported probability of being operational by December 31st, 2020. Controls across all regressions include the prior and the gap between the signal and the prior (log units), date fixed effects, the current status of business, the essential classification. In Panel B, the dependent variable in Col. (1) is the log expected demand, the response to the question "If you are fully open by *randomized date*, what share of your customers do you expect at that time, compared to before the crisis? Please provide your best guess." The instrument for expected demand is an information instrument is shown to a random subset of participants before we elicit demand expectations. The message received is "Before continuing, we want to share some interesting information. Based on your profile, location, and concerns, our polls show that similar businesses anticipate [rolling mean] % of customers will return by [future date]." †: Columns with additional controls contain the additional controls from the main OLS specification in Table 5, namely the natural logarithm of (1+COVID cases per capita), physical proximity, owner age, likelihood of having customers over 65, ease of conducting business online, the natural logarithm of population density, and the county-level share of the vote that went to the Republican candidate in the 2016 presidential election. Standard errors are clustered at the region × business type level, which is the level at which the information treatment is assigned. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Instrumenting Expected Customer Demand: Essential Downstream Businesses

Panel A: 2SLS

	(1) Reopen	(2) Reopen†	(3) Lag	(4) Lag†	(5) Lag ≥ 4wk	(6) Lag ≥ 4wk†	(7) Open Dec.	(8) Open Dec.†
ln(Share Cust. Returning)	-2.446***	-2.464***	-1.766***	-2.081***	-0.363***	-0.411***	0.129***	0.087*
	(0.365)	(0.490)	(0.515)	(0.556)	(0.117)	(0.118)	(0.049)	(0.046)
Restriction FE	No	No	Yes	Yes	Yes	Yes	No	No
Additional Controls	No	Yes	No	Yes	No	Yes	No	Yes
Kleibergen-Paap F stat	3.4	3.5	3.8	4.2	3.8	4.2	2.8	2.4
Mean Dep. Var.	1.43	1.43	1.43	1.43	0.19	0.19	0.80	0.80
Std. Dev. Dep. Var.	1.52	1.52	1.52	1.52	0.40	0.40	0.18	0.18
R^2	0.08	0.07	0.45	0.31	0.04	-0.05	0.95	0.96
Observations	15,859	15,859	15,777	15,777	15,777	15,777	13,213	13,213

Panel B: First-Stage and Reduced Form

	First Stage		Reduced Form							
	(1) Demand	(2) Demand†	(3) Reopen	(4) Reopen†	(5) Lag	(6) Lag†	(7) Lag ≥ 4wk	(8) Lag ≥ 4wk†	(9) Open Dec.	(10) Open Dec.†
Share Essential Buyers × B2B	0.528*	0.465*	-1.292*	-1.147*	-0.638*	-0.781**	-0.131	-0.155*	0.064*	0.034
	(0.286)	(0.250)	(0.713)	(0.628)	(0.359)	(0.366)	(0.080)	(0.081)	(0.036)	(0.029)
Restriction FE	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Additional Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Mean Dep. Var.	3.72	3.72	1.43	1.43	1.43	1.43	0.19	0.19	0.80	0.80
Std. Dev. Dep. Var.	0.88	0.88	1.52	1.52	1.52	1.52	0.40	0.40	0.18	0.18
R^2	0.09	0.11	0.05	0.08	0.42	0.43	0.04	0.05	0.02	0.03
Observations	15859.00	15859.00	15859.00	15859.00	15777.00	15777.00	15777.00	15777.00	13213.00	13213.00

Note: In Panel A, the dependent variable in Col. (1,2) *Reopen* is the expected months to reopen. The dependent variable in Col. (3,4) *Lag* is the same outcome (that is, months until reopening), but includes a fixed effect for the date restrictions are lifted. In Col. (5,6) *Lag* $\geq$ *4wk* is a indicator variable that evaluates to 1 if the firm's estimated reopening date is at least one month/four weeks after the estimated date restrictions are lifted. In Col. (7,8) the dependent variable *Open Dec.* is the self-reported probability of being operational by December 31st, 2020. In Panel B, the dependent variable in Col. (1,2) is the log expected demand, the response to the question "If you are fully open by *randomized date*, what share of your customers do you expect at that time, compared to before the crisis? Please provide your best guess." The instrument for expected demand is the share of downstream business buyers that are in essential industries interacted with an indicator for whether the business is in a B2B industry; see Section II for further discussion of the BEA data used to construct this measure. All specifications include controls for the date at which demand beliefs are elicited, the (uninteracted) share of downstream business buyers that are in essential industries, an indictor for whether the business is in a B2B industry, and an indicator for whether the business is in an essential industry. †: Columns with additional controls contain the additional controls from the main OLS specification in Table 5, namely the natural logarithm of (1+COVID cases per capita), physical proximity, owner age, likelihood of having customers over 65, ease of conducting business online, the natural logarithm of population density, and the county-level share of the vote that went to the Republican candidate in the 2016 presidential election. Standard errors are clustered at the industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Factors Contributing to the Probability of Being Open in December, 2020

	(1)	(2)	(3)
Mo. until No Restrictions	-0.0256***		-0.0164***
	(0.0011)		(0.0011)
ln(Share Returning Customers)		0.0637***	0.0567***
		(0.0018)	(0.0019)
ln(COVID cases per cap.)	0.0014	-0.0001	0.0011
	(0.0015)	(0.0015)	(0.0015)
Emp. Physical Proximity	-0.0213***	-0.0213***	-0.0168***
	(0.0050)	(0.0058)	(0.0052)
× ln(COVID cases p.c.)	-0.0017*	-0.0009	-0.0010
	(0.0009)	(0.0010)	(0.0009)
Owner Age	0.0000	0.0001	0.0000
	(0.0004)	(0.0004)	(0.0004)
× ln(COVID cases p.c.)	-0.0001*	-0.0001	-0.0001*
	(0.0000)	(0.0000)	(0.0000)
Customers Over 65	0.0154***	0.0116**	0.0110**
	(0.0055)	(0.0049)	(0.0046)
× ln(COVID cases p.c.)	0.0009	0.0004	0.0004
	(0.0009)	(0.0008)	(0.0008)
Essential Business	0.0212***	0.0172***	0.0128***
	(0.0031)	(0.0030)	(0.0030)
ln(Pop. Density)	-0.0002	-0.0000	-0.0006
	(0.0014)	(0.0013)	(0.0013)
Ease Operating Online	-0.0012	0.0007	0.0009
	(0.0017)	(0.0016)	(0.0016)
GOP Vote Share (County)	0.0165	0.0042	-0.0077
	(0.0123)	(0.0114)	(0.0114)
DV Mean	0.792	0.792	0.792
DV SD	0.185	0.185	0.185
Residual SD	0.180	0.175	0.174
R^2	0.0594	0.1087	0.1225
N	16,677	16,677	16,677

Note: The outcome in all columns is the answer to the question "What is the likelihood of your business remaining operational by Dec. 31, 2020? Please provide your best guess.". Businesses that were permanently closed at the time of the survey are excluded from these regressions. *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors in parentheses, clustered at county level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A Appendix: Additional Tables

Table A1: Census Industry versus Survey Industry Breakdown

Industry	Census Percentage	Survey Percentage
Agriculture, Forestry, Fishing and Hunting	0.4	1.1
Mining, Quarrying, and Oil and Gas Extraction	0.3	0.3
Utilities	0.1	0.3
Construction	11.7	7.6
Manufacturing	4.1	6.0
Wholesale and Retail Trade	15.7	13.1
Transportation and Warehousing	3.1	1.2
Information	1.3	2.1
Finance and Insurance	4.0	6.8
Real Estate and Rental and Leasing	5.2	8.8
Professional, Scientific, and Technical Services	13.5	14.6
Management of Companies and Enterprises	0.3	0.0
Administrative and Support and Waste Remediation Svcs	5.8	3.8
Educational Services	1.5	3.3
Health Care and Social Assistance	10.9	8.8
Arts, Entertainment, and Recreation	2.2	6.9
Accommodation and Food Services	9.0	5.2
Other Services (except Public Administration)	11.6	9.2

Notes. This table reports results of Census and Survey shares by industry for firms with fewer than 500 employees. Survey response shares are conditional on being able to classify industries, with unavailable or "Other" industry classifications omitted from the denominator. We combine wholesale and retail trade.

Table A2: Tobit: Contribution of Various Factors to the Small Business Reopen Decision

	(1) Reopen	(2) Restrictions	(3) Lag	(4) Lag $\geq$ 4wk	(5) Reopen	(6) Restrictions	(7) Lag	(8) Lag $\geq$ 4wk
	All Businesses				*Excluding Fully Open Businesses*			
ln(COVID cases per cap.)	0.1764***	0.1679***	0.0506***	0.0055*	0.0239*	0.0468***	0.0133	-0.0003
	(0.0250)	(0.0239)	(0.0143)	(0.0030)	(0.0134)	(0.0146)	(0.0117)	(0.0037)
Emp. Physical Proximity	0.4474***	0.5168***	0.0603	0.0128	0.0136	0.1480**	-0.0398	-0.0060
	(0.0879)	(0.0930)	(0.0469)	(0.0109)	(0.0612)	(0.0734)	(0.0444)	(0.0106)
$\times$ ln(COVID cases p.c.)	-0.0135	-0.0132	-0.0039	0.0006	0.0074	-0.0025	0.0053	0.0023
	(0.0146)	(0.0154)	(0.0081)	(0.0018)	(0.0102)	(0.0121)	(0.0076)	(0.0018)
Owner Age	-0.0033	-0.0098**	0.0056	0.0007	0.0013	-0.0077**	0.0035	0.0004
	(0.0046)	(0.0040)	(0.0039)	(0.0007)	(0.0035)	(0.0036)	(0.0030)	(0.0008)
$\times$ ln(COVID cases p.c.)	0.0002	-0.0002	0.0005	0.0001	0.0002	-0.0003	0.0002	0.0000
	(0.0004)	(0.0004)	(0.0004)	(0.0001)	(0.0003)	(0.0004)	(0.0003)	(0.0001)
Customers Over 65	-0.2057***	-0.1552*	-0.0701	-0.0073	-0.0983**	-0.0622	-0.0940**	-0.0139
	(0.0652)	(0.0812)	(0.0617)	(0.0100)	(0.0474)	(0.0750)	(0.0380)	(0.0124)
$\times$ ln(COVID cases p.c.)	-0.0252**	-0.0151	-0.0133	-0.0021	-0.0032	0.0058	-0.0092	-0.0021
	(0.0110)	(0.0132)	(0.0100)	(0.0016)	(0.0082)	(0.0123)	(0.0064)	(0.0022)
Essential Business	-0.6093***	-0.6167***	-0.1445***	-0.0265***	-0.1499***	-0.2614***	-0.0627**	-0.0186***
	(0.0404)	(0.0385)	(0.0308)	(0.0056)	(0.0336)	(0.0358)	(0.0262)	(0.0067)
Ease Operating Online	0.0962***	0.0660***	0.0502**	0.0048	0.0287	0.0069	0.0334**	0.0031
	(0.0242)	(0.0210)	(0.0200)	(0.0034)	(0.0183)	(0.0183)	(0.0159)	(0.0042)
ln(Pop. Density)	-0.0881***	-0.0919***	-0.0204*	-0.0024	-0.0203*	-0.0411***	-0.0077	-0.0006
	(0.0217)	(0.0216)	(0.0115)	(0.0021)	(0.0122)	(0.0135)	(0.0105)	(0.0029)
GOP Vote Share (County)	-2.4602***	-2.0610***	-1.0669***	-0.1707***	-1.1861***	-0.9779***	-0.7219***	-0.1573***
	(0.1699)	(0.1717)	(0.1115)	(0.0211)	(0.1080)	(0.1218)	(0.0944)	(0.0264)
Restriction FE	No	No	Yes	Yes	No	No	Yes	Yes
DV Mean	1.306	1.051	1.306	0.177	2.073	1.669	2.073	0.280
DV SD	1.487	1.408	1.487	0.381	1.386	1.455	1.386	0.449
Psuedo R^2	0.0249	0.0288	0.1800	0.0458	0.0130	0.0135	0.1066	0.2813
N	28,034	28,034	28,034	28,034	17,659	17,659	17,659	17,659

Note: *Reopen* is the expected months to reopen. *Restriction* is the estimated months until restrictions are lifted. *Lag* takes the same outcome as Reopen, but adds a fixed effect for *Restriction*. *Lag $\geq$ 4wk* is a indicator variable that evaluates to 1 if the firm's estimated reopening date is at least one month/four weeks after the estimated date restrictions are lifted. Businesses that were permanently closed at the time of the survey are excluded from these regressions; businesses that were fully open at the time of the survey are excluded from columns $5-8$. *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors in parentheses, clustered at county level. Note that the survey questions in which reopening and restriction beliefs are elicited is mid-way through the survey, thus in some columns we are able to have more observations than we have complete survey responses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Contribution of Various Factors to the Small Business Reopen Decision, County Fixed Effects

	(1) Reopen	(2) Restrictions	(3) Lag	(4) Lag $\geq$ 4wk	(5) Reopen	(6) Restrictions	(7) Lag	(8) Lag $\geq$ 4wk
	All Businesses				*Excluding Fully Open Businesses*			
Emp. Physical Proximity	0.333***	0.412***	0.0487	0.000176	0.0632	0.215***	-0.00528	-0.0228
	(0.0629)	(0.0681)	(0.0494)	(0.0164)	(0.0709)	(0.0818)	(0.0638)	(0.0192)
× ln(COVID cases p.c.)	0.0160	0.0186*	0.00458	-0.00126	0.0135	0.0111	0.00813	-0.000494
	(0.0103)	(0.0111)	(0.00822)	(0.00272)	(0.0118)	(0.0136)	(0.0108)	(0.00328)
Owner Age	-0.000917	-0.00779***	0.00460*	0.00107	0.00169	-0.00868**	0.00422	0.000744
	(0.00321)	(0.00277)	(0.00264)	(0.000809)	(0.00360)	(0.00353)	(0.00308)	(0.000949)
× ln(COVID cases p.c.)	0.000229	-0.000286	0.000454	0.000122	0.000322	-0.000314	0.000378	0.0000788
	(0.000339)	(0.000350)	(0.000307)	(0.0000939)	(0.000394)	(0.000470)	(0.000362)	(0.000119)
Customers Over 65	-0.163***	-0.164**	-0.0427	-0.00834	-0.110	-0.115	-0.0964	-0.0304
	(0.0602)	(0.0680)	(0.0465)	(0.0171)	(0.0710)	(0.0864)	(0.0603)	(0.0201)
× ln(COVID cases p.c.)	-0.0201**	-0.0181*	-0.00646	-0.00220	-0.00745	-0.00472	-0.0111	-0.00496
	(0.00983)	(0.0107)	(0.00753)	(0.00278)	(0.0119)	(0.0139)	(0.00996)	(0.00343)
Essential Business	-0.303***	-0.333***	-0.0683***	-0.0254***	-0.121***	-0.240***	-0.0452*	-0.0172**
	(0.0241)	(0.0245)	(0.0180)	(0.00587)	(0.0307)	(0.0329)	(0.0235)	(0.00707)
Ease Operating Online	0.0514***	0.0366***	0.0242**	0.00432	0.0295*	0.0187	0.0280*	0.00208
	(0.0136)	(0.0125)	(0.0115)	(0.00368)	(0.0165)	(0.0171)	(0.0146)	(0.00451)
Restriction FE	No	No	Yes	Yes	No	No	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DV Mean	1.300	1.045	1.300	0.177	2.073	1.668	2.073	0.282
DV SD	1.485	1.404	1.485	0.382	1.385	1.453	1.385	0.450
Residual SD	1.412	1.320	1.090	0.366	1.330	1.385	1.125	0.366
R^2	.0957	.116	.461	.0808	.0782	.0919	.34	.337
N	26,957	26,957	26,957	26,957	16,695	16,695	16,695	16,695

Note: *Reopen* is the expected months to reopen. *Restriction* is the estimated months until restrictions are lifted. *Lag* takes the same outcome as Reopen, but adds a fixed effect for *Restriction*. *Lag* $\geq$ *4wk* is a indicator variable that evaluates to 1 if the firm's estimated reopening date is at least one month/four weeks after the estimated date restrictions are lifted. Businesses that were permanently closed at the time of the survey are excluded from these regressions; businesses that were fully open at the time of the survey are excluded from columns $5-8$. *Employee Physical Proximity*, *Customers Over 65*, and *Ease Operating Online* are converted to z-scores. Standard errors in parentheses, clustered at county level. Note that the survey questions in which reopening and restriction beliefs are elicited is mid-way through the survey, thus in some columns we are able to have more observations than we have complete survey responses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Expected Demand By Industry (NAICS 3-DIGIT)

NAICS-2 digit	NAICS-3 digit	Early May	Early June	Late May	Late June	July	August Sept	N
Arts, Entertainment, Rec.	Performing Arts, Sports	0.06	0.08	0.09	0.19	0.11	0.11	197
Arts, Entertainment, Rec.	Amusement, Gambling, & Rec.	0.03	0.07	0.03	0.19	0.08	0.17	195
Educational Services	Educational Services	0.10	0.12	0.07	0.07	0.14	0.14	477
Accommodation & Food Srvcs	Food Srvcs & Drinking Places	0.03	0.03	0.03	0.06	0.07	0.18	535
Accommodation & Food Srvcs	Accommodation	0.00	0.00	0.00	0.04	0.04	0.08	112
Retail Trade	Food & Beverage Stores	0.18	0.17	0.22	0.20	0.17	0.20	88
Retail Trade	Miscellaneous Store Retailers	0.14	0.10	0.10	0.08	0.05	0.16	250
Retail Trade	Health and Personal Care Stores	0.13	0.14	0.00	0.29	0.22	0.25	117
Administrative and Waste Srvcs	Administrative & Support Srvcs	0.08	0.12	0.08	0.14	0.17	0.18	723
Real Estate, Rental & Leasing	Real Estate	0.09	0.15	0.12	0.16	0.19	0.20	1226
Information	Other Information Services	0.30	0.30	0.24	0.38	0.14	0.27	128
Manufacturing	Printing & Support Activities	0.00	0.14	0.17	0.07	0.03	0.06	140
Manufacturing	Miscellaneous Manufacturing	0.00	0.07	0.04	0.25	0.13	0.31	135
Manufacturing	Food Manufacturing	0.06	0.07	0.33	0.06	0.19	0.27	95
Health Care & Social Assistance	Ambulatory Health Care Srvcs	0.10	0.09	0.03	0.14	0.18	0.24	851
Health Care & Social Assistance	Social Assistance	0.09	0.00	0.09	0.17	0.12	0.07	137
Professional & Technical Srvcs	Professional, Scientific, & Tech Svcs	0.11	0.14	0.18	0.17	0.18	0.25	1931
Other Services, Except Pub Admin	Repair & Maintenance	0.09	0.07	0.19	0.17	0.25	0.32	422
Other Services, Except Pub Admin	Religious, Grantmaking, Civic, Prof Orgs	0.05	0.13	0.11	0.21	0.20	0.40	94
Other Services, Except Pub Admin	Personal & Laundry Services	0.03	0.17	0.19	0.09	0.08	0.36	218
Construction	Construction of Buildings	0.11	0.17	0.18	0.14	0.17	0.22	521
Construction	Specialty Trade Contractors	0.15	0.21	0.13	0.17	0.16	0.26	417
Finance & Insurance	Insurance Carriers	0.06	0.38	0.15	0.24	0.35	0.29	167
Finance & Insurance	Securities, Commodity Contracts	0.30	0.36	0.22	0.40	0.31	0.35	123
Finance & Insurance	Credit Intermediation	0.03	0.24	0.15	0.22	0.16	0.11	241
Finance & Insurance	Funds, Trusts, & Financial Vehicles	0.26	0.05	0.24	0.29	0.27	0.38	121
Wholesale Trade	Merchant Wholesalers, Durable Goods	0.06	0.14	0.17	0.16	0.40	0.19	129

Notes. This table reports to the question about expected share of customers returning by month. Survey response shares are conditional on being able to classify industries, with unavailable or "Other" industry classifications omitted from the denominator. We combine wholesale and retail trade. Responses are organized according to NAICS-2 digit share expecting greater than 90% of their customers to return by September, from low to high.

Appendix 1: Amazon Mechanical Turk Survey

How easy/common would it be for this business to provide services or goods online?

Rare/challenging to do online only, 0-10%

Possibly online only, 10-25%

Commonly online only, 25-75%

Very frequently online only, >75%

How likely is it for customers of this business to fall in each age bracket?

0-24 years old	Never or very rarely in this age bracket, 0-10%
	Occasionally in this age bracket, 10-25%
	Commonly in this age bracket, 25-75%
	Very frequently in this age bracket, >75%

25-44 years old	Never or very rarely in this age bracket, 0-10%
	Occasionally in this age bracket, 10-25%
	Commonly in this age bracket, 25-75%
	Very frequently in this age bracket, >75%
45-64 years old	Never or very rarely in this age bracket,0-10%
	Occasionally in this age bracket, 10-25%
	Commonly in this age bracket, 25-75%
	Very frequently in this age bracket, >75%
65 years old or older	Never or very rarely in this age bracket, 0-10%
	Occasionally in this age bracket, 10-25%
	Commonly in this age bracket, 25-75%
	Very frequently in this age bracket, >75%

Appendix 2: Text of Alignable Survey Questions

Are you currently open? Fully open with the same products and services as before, Open but with fewer or different products or services, Temporarily closed but plan to reopen, Permanently closed

Are you waiting on other businesses to open before fully opening yourself? (Select the category that matters most.)Yes, supplier(s), Yes, business(es) that refer customers to our business, Yes, business(es) that are our customers, Yes, I am waiting for similar businesses to fully open to see if customers return, Yes, I will fully open if similar businesses open to prevent loss of customers, No, what other businesses do is not relevant

Although you are currently open, if these other businesses closed, would it affect your ability to remain open? (Select the category that matters most.)

When will enough of your suppliers be available for you to fully open?

When will enough businesses that you rely on for customers be open for you to fully open?

What share of business customers do you think will be fully open by *[future date]*?

What share of competing businesses do you think will be fully open by *[future date]*?

What share of similar businesses in your industry and location do you think will be fully open by *[future date]*?

Before continuing, we want to share some interesting information. Based on your profile, location, and concerns, our polls show that similar businesses anticipate *[rolling mean]* % of customers will return by *[future date]*.

When disruptions are over, will you be in a better or worse position relative to your competition?

When will your business be fully open? Please provide your best guess.

If you are fully open in *[future date]*, what share of your customers do you expect at that time, compared to before the crisis? Please provide your best guess.

If there are legal restrictions on fully reopening your business, when do you expect them to be lifted?

What is the likelihood of your business remaining operational by Dec. 31, 2020? Please provide your best guess.

Suppose we could extend you a cash grant of *[grant amount]*. Would you choose to open over the next two weeks?

Suppose we could extend you a cash grant of *[grant amount]* but only on the condition that you remain closed for the next two week. Would you choose to open over the next two weeks instead of taking the cash grant?