The Impact of COVID Restrictions on Business Dynamics

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Abstract

We investigate the effects of COVID-19 restrictions on business dynamics and labor markets using United States county-level data on in-person interaction limitations. Our analysis shows that tighter restrictions lead to increased business closures and decreased new business formation. Consequently, job creation slows, job losses from business closures rise, and existing firms experience stagnation in workforce growth. The negative effects of COVID-19 restrictions on business growth affect firms of all sizes. Furthermore, while the impact varies across sectors, most experience detrimental effects. Our analysis suggests that the pandemic's influence on business dynamics will persist beyond the immediate crisis period.

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1 Introduction

The COVID-19 pandemic led to unprecedented restrictions on in-person interactions throughout the world. In extreme cases, individuals were forbidden from leaving their homes altogether. While such restrictions were designed to decrease mortality from COVID-19, the enduring economic effects of these restrictions are unclear.[1]

In this paper, we analyze the effects of COVID-19 restrictions on business formation, business closures, and employment across U.S. counties. We find that increased restrictions, as measured by a stringency index detailed in Section 2, result in fewer new businesses, more closures, and lower overall employment even after accounting for COVID-19 mortality and government financial support to businesses. Specifically, a one standard deviation increase in restriction stringency leads to an 11% decrease in new business applications, a 1% decrease in business openings, a 6% increase in firm deaths, and a 54% reduction in net job creation, all relative to median values. Restriction stringency decreases the growth of establishments of all sizes, suggesting that the impacts of COVID-19 restrictions on business dynamics in counties may be long-lasting.

Our sector-specific analysis reveals varied responses to COVID-19 restrictions, with an overall negative effect. Increased restrictions are associated with a significant decrease in entry rates for food service and construction sectors. Conversely, entry rates in the transportation and information sectors show an increase. Surprisingly, even sectors not directly impacted by restrictions, like the information sector, suffered a net negative effect.

We analyze the impact of COVID-19 restrictions on sectors by their telecommut-

[1]Spiegel and Tookes (2021),Goldstein, Levy Yeyati, and Sartorio (2021), Bongaerts, Mazzola, and Wagner (2021), Spiegel and Tookes (2022), and Barrot, Bonelli, Grassi, and Sauvagnat (2024) study the impact of restrictions on in-person activity and COVID-19 mortality.

ing capacity, contact intensity, and flexibility (Dingel and Neiman, 2020; Albanesi and Kim, 2021). Non-telecommutable sectors face more severe job losses than telecommutable sectors. Education and Healthcare, which require high levels of contact, see significant declines in new establishment creation and overall job creation, more so than sectors with less contact. However, we find decreased new business formation even in telecommutable industries and in industries with low contact intensity. Our findings of widespread adverse impacts from restrictions on in-person activities show that the rules generated considerable collateral damage.

Ours is the first paper to empirically identify the effect of mandatory COVID-19 restrictions on U.S. business dynamics using granular data on restrictions on in-person activity.[2] The most related paper to ours is Barrot et al. (2024). Barrot et al. (2024) demonstrate that mandatory statewide business closures at the start of the pandemic impose losses on firms and workers by studying the profits of publicly traded firms. However, we use a broader measure of mandatory business limits, including capacity restrictions such as fully closed, outdoor service, 25% capacity, 50% capacity, over 50%, and fully open.[3] Our data covers changes by sector since states did not open and close all businesses simultaneously. Orders also varied by county, which we track as well. In terms of period coverage, our restriction stringency data extends beyond the first few months of the pandemic to the end of 2021.

Bizjak, Kalpathy, Mihov, and Ren (2022) find that reductions in foot traffic from voluntary in-person restrictions do not appear to affect the unemployment rate in a county. While we focus on business dynamics more specifically, our results suggest that mandatory restrictions have more impact than voluntary restrictions on eco-

[2]Early literature (Verschuur, Koks, and Hall, 2021; König and Winkler, 2021; Størdal, Lien, Mydland, and Haugom, 2021) using variation at the national level finds mixed results, likely because of the lack of precision in identifying the effect of interventions using variation across countries. Gungoraydinoglu, Öztekin, and Öztekin (2021) find that lockdown measures at the state level result in contractions in GDP while Goolsbee and Syverson (2021) find that most of the decline in foot traffic was due to disease risk rather than mandated restrictions.

[3]See also Spiegel and Tookes (2022) for a list of capacity designations.

nomic activity, perhaps because they create greater variation across counties. Our findings confirm the theoretical predictions of the Eichenbaum, Rebelo, and Trabandt (2021) model on how restrictions on human interaction affect economic activity. Our results also complement those of Bizjak, Kalpathy, Mihov, and Ren (forthcoming) who find that, in contrast to lockdowns, vaccinations increase economic activity empirically.

We contribute to the emerging literature on the broader business effects of COVID-19. Duchin and Harford (2021) highlight the variation in dividends, openings, and closings throughout the pandemic, emphasizing the reallocation of capital between sectors. Our research further analyzes how COVID-19 restrictions reshape capital allocation across sectors, affecting businesses of all sizes. By focusing on aggregate, firm size, and sector-specific impacts, we provide a comprehensive view of the economic transformations triggered by the pandemic.

Other research uses firm, market, and GDP data to analyze the economic impact of COVID-19 in the United States. Hassan, Holland, van Lent, Schwedeler, and Tahoun (2023) use earnings calls to show that firms are concerned with demand reduction, supply chain issues, and uncertainty. Gourinchas, Şebnem Kalemli-Özcan, Penciakova, and Sander (2023) provide ex-ante forecasts of the impact of COVID-19 on business failures for small and medium sized enterprises. Finally, several papers (Autor, Cho, Crane, Goldar, Lutz, Montes, Peterman, Ratner, Villar, and Yildirmaz, 2022; Bartlett and Morse, 2021; Granja, Makridis, Yannelis, and Zwick, 2022; Griffin, Kruger, and Mahajan, 2023a,b) study how the availability of capital through the Payment Protection Program (PPP) program affected business dynamics. While the focus of our research is not the effect of the PPP program, we control for PPP in our empirical specification. Our work complements these findings by illustrating the enduring economic impacts of restrictions in the United States on business creation and

destruction for private and public firms and subsequent labor market impacts at the county level.

The rest of the paper proceeds as follows. In the next section, we describe the data and methodology we use to identify the effect of lockdowns. We present our results in Section 3 and the sensitivity of those results to alternative specifications in Section 4. Section 5 offers concluding remarks.

2 Data and Methodology

2.1 Business Closures, Openings, and Labor Data

We define business openings, closures, and labor outcomes for firms and establishments using data from the Business Dynamics Statistics (BDS) spanning from 2013 to 2021. The BDS data is created from the Longitudinal Business Database (LBD). The use of the LBD in creating the BDS data permits tracking establishments, workers, and firms over time. The BDS data provides annual county-level measures of establishment openings and closings and job creation and destruction.[4]

The sample covers most United States economic activity, including nineteen 2-digit NAICS categories and a wide range of employment. Information on establishments is based on payroll tax records from the IRS. The sample excludes employees of private households, self-employed individuals, railroad employees, agricultural employees, and most government employees. The BDS sample includes employment from full- and part-time March 12 employees. This includes employees on leave, but it does not include proprietors or partners of unincorporated businesses.

We use two measures to capture the rate of establishment openings in each county.

[4]See BDS methodology.

We measure total establishment openings relative to the population in the county in our county-year level analysis. In our county-year-sector and county-year-size analysis, we use the establishment entry rate from the BDS. For instance, the county-year-sector establishment entry rate is computed as the count of new establishments in the county-year-sector dividend by the average of establishments in the county-sector in the current and prior years.

We include BDS establishment exit rates, defined as the number of establishments leaving or closing in the county divided by the average number of establishments in the current and previous year. For firm deaths, the BDS counts only those firms where all owned establishments have exited or closed, making firm deaths a stricter indicator of business decline compared to establishment exits. We then divide firm deaths by the county population per 10,000. These metrics help us assess the extent of business and establishment closures at the county level due to COVID-19 restrictions.

To assess the labor market impact of restrictions on existing, closing, and new establishments, we look at job creation and job destruction. Job destruction in the county is computed in the BDS as the sum of employment losses in the county from contracting and closing establishments. Job destruction from deaths is computed as employment losses from closing establishments. BDS computes job creation in the county as employment gains in the county from establishment expansions and establishment births. We then examine job creation from births, computed as the employment gain in the county from establishment births. Each job rate measure in the BDS is normalized using the average of employment at time t and t-1, represented by the Davis, Haltwanger, and Schuh (1996) (DHS) denominator.

Lastly, we consider changes to net employment via the net job creation rate and the excess labor allocation rate. The net job creation rate is computed by the BDS as the difference between the job creation rate and the job destruction rate. If this

measure is positive, it indicates that more jobs are being created than destroyed, leading to an increase in county employment. The BDS defines the labor reallocation rate as the sum of the job creation rate and the job destruction rate less the net job creation rate. This captures the rate of worker reallocation beyond what is needed to accommodate net job creations in the county-year. A positive reallocation rate implies there is more turnover of workers between jobs, beyond the normal level of churn expected in a healthy labor market. Both net job creation and the reallocation rate are normalized using the average of employment at time t and t-1, represented by the DHS denominator.

We supplement our analysis with County Business Patterns Data (CBP) from the US Census Bureau. The data allow us to see the total number of establishments by county, year, and establishment size. The CBP data also contains the total number of business applications per county-year, which we include in our main specifications. The data cover all businesses that apply for an Employer Identification Number (EIN) for the first time.

Finally, we examine new establishments, closures, and labor market dynamics across different sectors using 2-digit NAICS codes. In some sectors and counties, we have a significant amount of missing data because the census omits cells with fewer than three observations such that we exclude all rows with censored data. The BDS sector-level datasets facilitate comparisons based on 2-digit NAICS, telecommutability, contact intensity, and flexibility, following Dingel and Neiman (2020) and Albanesi and Kim (2021).

2.2 COVID-19 Variables

We rely on the Yale SOM-Tobin Center State and Local COVID Restriction Database to create a summary measure of COVID restriction stringency in counties. This data is a time-series database of business and related restrictions for every county in the United States from 2020-2021. To our knowledge, this is the most comprehensive database of COVID-19 restrictions imposed by US state, county, and city entities during the pandemic.

The time-series database contains mandates for businesses, mask requirements, and social gathering restrictions. Here we only use the business line restrictions on spas, gyms, retail, movies, restaurants, and bars. For each business line we construct a weekly stringency index that varies from 0 to 4. Fully open is scored as 0, and fully closed is scored as 4. Limits in between are scored proportionally to the upper bound in the database's categorization bucket. Capacity restrictions over 50% and less than 100% (i.e., fully open) are set to 1, restrictions over 25% and less than 50% are scored as 2, from 1% to 25% the weekly value is 3, and if the business is limited to outdoor service the score is 3.5.[5] Based on these values, the implicit assumption is that restrictions over 50% but less than fully open are equivalent to a 75% constraint. Similarly, outdoor only service is analogous to a 12.5% capacity limit. The cumulative stringency index is the cumulative total of the weekly values up to a particular date. From this we create an overall cumulative business stringency index by taking each of the six business line cumulative stringency indices, adding them together, and dividing by six. This average cumulative business stringency index (ACBS) as of the end of 2020 and 2021 are then used in the regressions that follow.[6] Note that this measure captures the breadth of restrictions in place, as well as the duration of the

[5] Only restaurants and bars have indicators for outdoor service.

[6] This restriction measure is comparable to the European stringency index using Oxford's COVID-19 Government Response Tracker (Gourinchas, Şebnem Kalemli-Özcan, Penciakova, and Sander, 2023; Stype, Yaya, and Osika, 2023; Gros, Ounnas, and Yeung, 2021).

restrictions.

We control for the per capita level of PPP loans and the COVID mortality rate (per 100,000 population) in each county to assess the impact of the restrictions more accurately. We source our PPP data from the Small Business Administration and the COVID mortality rates from USA Facts. Table 1 lists all variable definitions.

Table 1: Variable Definitions

Variable	Description
openings	New establishments to the county per capita (per 10,000 population).
applications	New business applications per capita (per 10,000 population).
estabsEntry	Count of establishments born in the county during the last 12 months divided by average number of establishments at t and t-1.
estabsExit	Count of establishments exiting the county in the last 12 months divided by average number of establishments at t and t-1.
jobDestruction	Count of all employment losses in the county from contracting and closing establishments, divided by average of employment for times t and t-1.
jobDestructionDeaths	Count of all employment losses in the county from closing establishments, divided by average of employment for times t and t-1.
jobCreation	Count of all employment gains in the county from expanding and opening establishments divided by average of employment for times t and t-1.
jobCreationBirths	Count of employment gains in the county from establishment births divided by average of employment for times t and t-1.
netJobCreation	JobCreation minus jobDestruction in the county.
reallocation	JobCreation plus jobDestruction minus the absolute netJobCreation in the county.
firmDeaths	Count of firms that have exited the county during the period per capita (per 10,000 population).
ACBS	In 2020, reflects the cumulative stringency index for gyms, retail, movies, restaurants, and bars. In 2021, represents the cumulative stringency index from 2020-2021.
deaths	COVID-19 deaths per capita (per 100,000 population).
PPP	PPP loans divided by current population.
solo	Growth rate in the number of establishments in the county with fewer than 5 employees.
tiny	Growth rate in the number of establishments in the county with 5-9 employees.
small	Growth rate in the number of establishments in the county with 10-19 employees.
medium	Growth rate in the number of establishments in the county with 20-49 employees.
large	Growth rate in the number of establishments in the county with 50-99 employees.
huge	Growth rate in the number of establishments in the county with more than 100 employees.

2.3 Summary Statistics

Table 2 and Table 3 present population-weighted summary statistics of business activity, COVID-19 variables, and labor dynamics using BDS and CBP data on county-years. Our dataset encompasses about 3,100 to 3,140 counties annually. PPP data are calculated per capita. Business openings, applications, and firm deaths are measured per 10,000 inhabitants, while the COVID mortality rate is per 100,000 population. The BDS data contains rates for establishment exits, net job creation, and reallocation. Establishment exits are divided by the number of establishments; all employment variables are divided by county employment.

Table 2 presents summary statistics for COVID variables and business dynamics. Panel A covers 2020-2021, highlighting the introduction of COVID death rates, PPP allocations, and the ACBS, which are zero in all years before 2020. There is significant variation across counties in COVID-related deaths, the ACBS, and PPP allocations, with PPP allocations showing a high standard deviation of $672 per capita. Comparing Panel A to Panel B, the rates of establishment exits, firm deaths, and labor reallocation are slightly higher during the COVID period in Panel A. Across all three panels, there are more business applications than actual openings, suggesting that filing applications is easier than establishing businesses. During the COVID period, business applications increase from 94 to 147 on average, over 1.5 times higher, while business openings remain stable.

Panel A of Table 2 also reports that the ACBS index has a standard deviation of 43. To gain intuition for what this means, consider two counties that differ in their ACBS by one standard deviation. Further assume the only policy each county uses is to either fully open or close all businesses in the index simultaneously. Across these two counties a difference of 43 indicates one of the counties fully closed all businesses for 10 and 3/4 weeks longer than the other during the COVID-19 pandemic. That is

a difference of over two and a half months, which shows how varied the county-by-county reaction was.

Table 2: Summary Statistics on Business Activity and COVID-19 Measures

Panel A: COVID Years (2020-2021)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
openings	6,142	21	11	13	16	20	26	32	35	8	0	615
applications	6,262	147	60	69	93	130	182	237	282	91	0	5,382
estabsExit	6,145	10	7	8	9	10	11	12	13	2	0	53
estabsEntry	6,142	10	6	7	8	10	12	13	14	2	0	66
firmDeaths	6,084	14	8	9	11	13	17	20	23	5	0	95
ACBS	6,262	120	61	67	85	117	149	185	200	43	0	223
deaths	6,262	173	39	52	89	148	246	318	375	109	0	7,834
PPP	6,262	1,171	372	474	674	1,037	1,544	2,039	2,334	672	0	6,290
Panel B: Pre Period (2013-2019)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
openings	21,488	21	11	13	16	20	25	30	33	7	0	146
applications	21,917	94	43	48	61	85	114	145	174	48	0	3,806
estabsExit	21,493	9	7	7	8	9	10	10	11	1	0	49
estabsEntry	21,484	10	6	7	8	10	11	12	13	2	0	42
firmDeaths	21,178	12	7	8	10	12	15	17	19	4	0	127
ACBS	21,917	0	0	0	0	0	0	0	0	0	0	0
deaths	21,917	0	0	0	0	0	0	0	0	0	0	0
PPP	21,917	0	0	0	0	0	0	0	0	0	0	0
Panel C: Full Sample (2013-2021)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
openings	27,630	21	11	13	16	20	25	30	34	8	0	615
applications	28,179	106	44	51	66	94	126	175	220	65	0	5,382
estabsExit	27,638	9	7	7	8	9	10	11	11	2	0	53
estabsEntry	27,626	10	6	7	8	10	11	12	13	2	0	67
firmDeaths	27,262	13	7	8	10	12	15	18	21	5	0	127
ACBS	28,179	27	0	0	0	0	0	122	153	54	0	223
deaths	28,179	39	0	0	0	0	0	168	256	89	0	7,834
PPP	28,179	266	0	0	0	0	0	1,150	1,653	586	0	6,290

Notes: This table shows population-weighted summary statistics of our business and COVID measures for different sample periods from 2013-2021. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table 3 shows that, during the COVID period (Panel A), net job creation is lower than in the pre-COVID era (Panel B). Specifically, mean net job creation drops from 2% to -2%, with more pronounced declines at the lower percentiles, shifting from -2% to -8% at the 5th percentile and from -1% to -7% at the 10th percentile. This stems from a lower job creation rate and a higher job destruction rate during COVID.

Table 4 displays population-weighted correlations. Analyzing the ACBS, we ob-

Table 3: Summary Statistics on Labor Dynamics

Panel A: COVID Years (2020-2021)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
jobDestructionDeaths	6,145	4	2	3	3	4	4	5	5	1	0	70
jobDestruction	6,258	13	9	10	11	13	16	18	20	3	0	103
jobCreationBirths	6,142	4	2	2	3	4	4	5	6	1	0	105
netJobCreation	6,258	-2	-8	-7	-4	-1	1	2	4	4	-76	99
jobCreation	6,258	11	8	9	10	11	13	14	15	2	0	108
reallocation	6,258	22	15	17	19	22	24	26	27	4	0	90
Panel B: Pre Period (2013-2019)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
jobDestructionDeaths	21,493	4	2	2	3	4	4	5	5	1	0	78
jobDestruction	21,899	11	8	9	10	11	12	13	14	2	0	110
jobCreationBirths	21,484	4	2	3	3	4	5	6	6	1	0	69
netJobCreation	21,899	2	-2	-1	1	2	3	4	6	3	-101	142
jobCreation	21,900	13	9	10	11	13	14	16	17	3	0	154
reallocation	21,900	21	15	17	19	21	24	25	27	4	0	93
Panel C: Full Sample (2013-2021)												
	N	Mean	p5	p10	p25	p50	p75	p90	p95	St. Dev.	Min.	Max.
jobDestructionDeaths	27,638	4	2	2	3	4	4	5	5	1	0	78
jobDestruction	28,157	12	8	9	10	11	12	15	17	3	0	110
jobCreationBirths	27,626	4	2	2	3	4	5	5	6	1	0	105
netJobCreation	28,157	1	-6	-3	-0	2	3	4	5	4	-101	142
jobCreation	28,158	13	9	9	11	13	14	15	16	3	0	154
reallocation	28,158	21	15	17	19	22	24	25	27	4	0	93

Notes: This table shows population-weighted summary statistics of our labor measures for different sample periods from 2013-2021. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

serve weak correlations between openings, applications, and the ACBS. There is a strong positive correlation between the ACBS and both establishment exits and firm deaths. Additionally, there is a strong negative correlation with net job creation, a low correlation with reallocation, and a moderate correlation with the COVID death rate. Generally, most business metrics within the county positively correlate, indicating that counties with higher rates of openings also tend to experience higher applications, exits, and firm deaths. The correlation between the ACBS and COVID death rates is 24%, suggesting that counties with higher death rates attempt to control the situation through increased restriction stringency. However, there remains significant geographic heterogeneity in the level of restrictiveness unexplained by differences in disease severity. The correlation between business applications and

openings is 60%; Decker and Haltiwanger (2023) provides further discussion on the recent trends in business applications versus openings.

Table 4: Sample Correlations for Business Dynamics, Labor, and COVID-19 Measures 2020-2021

	openings	applications	estabsExit	firmDeaths	netJobCreation	reallocation	ACBS	deaths	PPP
openings	1.00								
applications	0.60***	1.00							
estabsExit	0.49***	0.36***	1.00						
firmDeaths	0.84***	0.41***	0.63***	1.00					
netJobCreation	-0.07***	-0.07***	-0.35***	-0.25***	1.00				
reallocation	0.47***	0.32***	0.38***	0.28***	0.12***	1.00			
ACBS	0.12***	-0.03*	0.48***	0.28***	-0.45***	0.11***	1.00		
deaths	-0.13***	0.06***	0.18***	-0.01	-0.38***	-0.08***	0.24***	1.00	
PPP	0.45***	0.21***	0.08***	0.51***	0.20***	0.05***	-0.07***	-0.37***	1.00

Notes: This table shows population-weighted correlations of our main measures. Variables are at the county-year level from 2020-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

2.4 Identifying the Impact of COVID Restriction Stringency

We assess the impact of local restriction stringency on business and labor market activity by estimating the following specification:

$$Y_{it} = \boldsymbol{\beta_A} ACBS_{it} + \boldsymbol{\beta_D} Deaths_{it} + \boldsymbol{\beta_P} PPP_{it} + \theta_t + \gamma_i + \epsilon_{it}$$

where Y_{it} includes labor and business dynamics, $Deaths_{it}$ is the COVID-19 mortality rate, PPP_{it} is the dollar amount of PPP loans per capita, θ_t is a year fixed effect, and γ_i is a county fixed effect. $ACBS_{it}$, $Deaths_{it}$, and PPP_{it} take a value of 0 for years prior to 2020. Our sample spans the years 2013-2021.

In our specifications, we apply population weighting to mitigate the influence of sparsely populated counties. These counties frequently have zero restrictions during COVID-19 and typically exhibit minimal business activity, both in terms of new establishment creation and establishment exits. By using population weighting, we ensure that our analysis accurately reflects the economic dynamics of more populated areas, providing a clearer picture of the overall impact of restrictions and business activities.[7]

3 Results

Table 5 presents our results for business creation and business closure. Our estimates indicate that restricting businesses operations had a profound impact on firms. As the stringency index rises, so do county level business exits and firm death rates. In terms of entry, higher stringency index values are associated with fewer business applications and fewer new establishment entry rates. A one standard deviation increase

[7] We also test our specifications with populations exceeding 100,000 and observe similar results.

in the stringency index results in $43 \times -0.23 = -9.89$ fewer applications per 10,000 population and $43 \times -0.0039 = -0.17$ fewer establishment openings (Columns 1 and 2). Given that the median numbers of applications and openings per 10,000 are 94 and 20 over the full sample (see Panel C of Table 2), this represents about 11% fewer applications and about 1% fewer openings.

Table 5: Impact of COVID Restrictions on County Business Activity

	(1)	(2)	(3)	(4)
Dep. Var.	openings	applications	estabsExit	firmDeaths
ACBS	-0.0039***	-0.23***	0.013***	0.017***
	(0.00070)	(0.010)	(0.00030)	(0.00050)
deaths	-0.0043***	0.0045	0.0016***	-0.0018***
	(0.00031)	(0.0045)	(0.00013)	(0.00022)
PPP	-1.5e-08***	1.7e-06***	1.2e-08***	8.7e-08***
	(4.9e-09)	(7.1e-08)	(2.1e-09)	(3.5e-09)
Observations	27,627	28,179	27,637	27,260
R^2	0.944	0.835	0.740	0.925
Year FEs	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business outcomes from the BDS and CBP. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Beyond reducing business formation, restriction stringency also increases firm closures and establishment exits. In Column 3 of Table 5 a one standard deviation increase in the stringency index leads to $43 \times .013 = .56$ increase in establishment exits or 6% of the median of 9 over the full sample (see Panel C of Table 2). Column 4 shows that increasing the ACBS by one standard deviation leads to $43 \times .017 = .73$ firm deaths. Relative to the median of 12 firm deaths per 10,000 population, this represents 6% of the median.

Table 6 shows that job creation rates from new firms decline, overall job creation

decreases, and job destruction increases for both existing and new firms. In Column 2, increasing the ACBS by one standard deviation increases the job destruction rate by $43 \times .020 = .86$. With a median value of 11, this represents 8% of the median (see Panel C of Table 3). The increase in job destruction is driven by existing firms reducing their employment (see Column 2) and by firm deaths reducing employment (see Column 1). Column 1 shows that increasing the ACBS by one standard deviation increases the rate of job destruction from firm deaths by $43 \times .0036 = .15$. As the median is 4, this represents 4% of the median.

Columns 3 and 5 of Table 6 show that the stringency index decreases the number of new jobs created. This results from existing firms reducing their employment and declining business creation. Net job creation in a county also decreases with the ACBS. A one standard deviation increase in the ACBS reduces the net job creation rate by $43 \times -.025 = -1.08$ (see Column 4). With a median net job creation rate of 2, this represents 54% of the median. Additionally, the excess reallocation rate is negative, indicating that reallocation cannot accommodate shifts in employment (see Column 6). A one standard deviation increase in the ACBS reduces the reallocation rate by $43 \times -.0045 = -.19$. As a percentage of the median reallocation rate, this represents approximately 1% of the median.

Table 6: Impact of COVID Restrictions on County Labor Market Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0036***	0.020***	-0.0016***	-0.025***	-0.0053***	-0.0045***
	(0.00044)	(0.00073)	(0.00045)	(0.0010)	(0.00067)	(0.00092)
deaths	-0.00020	-0.0024***	0.00010	0.0020***	-0.00042	-0.0042***
	(0.00019)	(0.00032)	(0.00020)	(0.00045)	(0.00030)	(0.00040)
PPP	-5.8e-09*	4.5e-08***	1.3e-09	-6.8e-08***	-2.3e-08***	-2.0e-08***
	(3.0e-09)	(5.1e-09)	(3.1e-09)	(7.1e-09)	(4.7e-09)	(6.4e-09)
Observations	27,637	28,157	27,622	28,157	28,157	28,157
R^2	0.304	0.536	0.410	0.459	0.551	0.567
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on labor outcomes from the BDS. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

3.1 Sector by Establishment Size Results

We examine how changes in exit and entry rates affect the reallocation of establishments across employment size categories. With reduced employment and fewer new establishments being created, we expect a decline in the growth of establishments across size bins. For instance, a large establishment might cut jobs, and a small one might decrease hiring or shut down altogether. We assess how the stringency index impacts establishments from those with fewer than 5 employees to those with over 100.[8]

We estimate the following specification separately for each establishment size category:

$$Y_{it} = \boldsymbol{\beta_A} ACBS_{it} + \boldsymbol{\beta_D} Deaths_{it} + \boldsymbol{\beta_P} PPP_{it} + \theta_t + \gamma_i + \epsilon_{it}$$

where Y_{it} is the growth rate in the number of establishments in the size category, $Deaths_{it}$ is the COVID-19 mortality rate, PPP_{it} is the dollar amount of PPP loans per capita, θ_t is a year fixed effect, and γ_i is a county fixed effect. $ACBS_{it}$, $Deaths_{it}$, and PPP_{it} take a value of 0 for years prior to 2020. Our sample spans the years 2013-2021.

Figure 1 and Table 7 present our findings. Figure 1 plots the coefficient β_A for solo, tiny, small, medium, large, and huge establishments. We observe a decrease in the overall growth rate of establishments across all size categories, except for establishments with 1-4 employees, which we view as representing primarily self-employment. However, the increase for self-employment establishments is only marginally statistically significant. The last bar in Figure 1 shows larger establishments, even those with more than 100 employees, experience a reduction in their growth rate.

Column 1 of Table 7 shows that a one standard deviation increase in the ACBS leads to a $43 \times .0018 = .08$ increase in the growth rate of self-employment establish-

[8]Research by Bartlett and Morse (2021) indicates that a firm's survival likelihood varies with its size.

ments, which represents 5% of the median rate of 1.72. Column 2 shows that a one standard deviation increase in the ACBS decreases the growth rate of tiny establishments by $43 \times -.0192 = -.83$, representing 176% of the median growth rate of $.47$. In Column 3, a one standard deviation increase in the ACBS decreases the growth rate for small establishments by $43 \times -.0298 = -1.28$, representing 180% of the median growth rate of $.71$. In Column 4, a one standard deviation increase in the ACBS causes medium-sized establishments to decline by 99% of the median rate of 1.40. Columns 5 and 6 demonstrate that a one standard deviation increase in the ACBS decreases large and huge establishment growth rates by more than 100% of their median rates of $.70$ and $.24$, respectively.

In Tables A.1, A.2, and A.3, we examine the factors behind the decline in establishment growth for establishments with fewer than 20 employees, 20-499 employees, and more than 500 employees. We find that the reduced growth rate is due to job cuts, fewer new entrants, and more exits.

Table 7: Impact of COVID Restrictions on Growth in Number of Establishments

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	solo	tiny	small	medium	large	huge
ACBS	0.0018*	-0.0192***	-0.0298***	-0.0320***	-0.0353***	-0.0228***
	(0.0010)	(0.0016)	(0.0020)	(0.0024)	(0.0048)	(0.0031)
deaths	-0.0017***	-0.0037***	-0.0020**	0.0018*	0.0084***	0.0032**
	(0.0005)	(0.0007)	(0.0009)	(0.0011)	(0.0022)	(0.0014)
PPP	-0.0002***	-0.0000	-0.0003**	-0.0003	-0.0001	-0.0016***
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0002)
Observations	12,512	24,933	24,773	24,231	22,006	24,638
R^2	0.585	0.126	0.132	0.213	0.170	0.944
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Counties	All	All	All	All	All	All
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on establishment growth from the CBP. Variables are at the county-year level from 2013-2021. Each column shows regressions of the ACBS on growth in the total number of establishments within the size classification. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

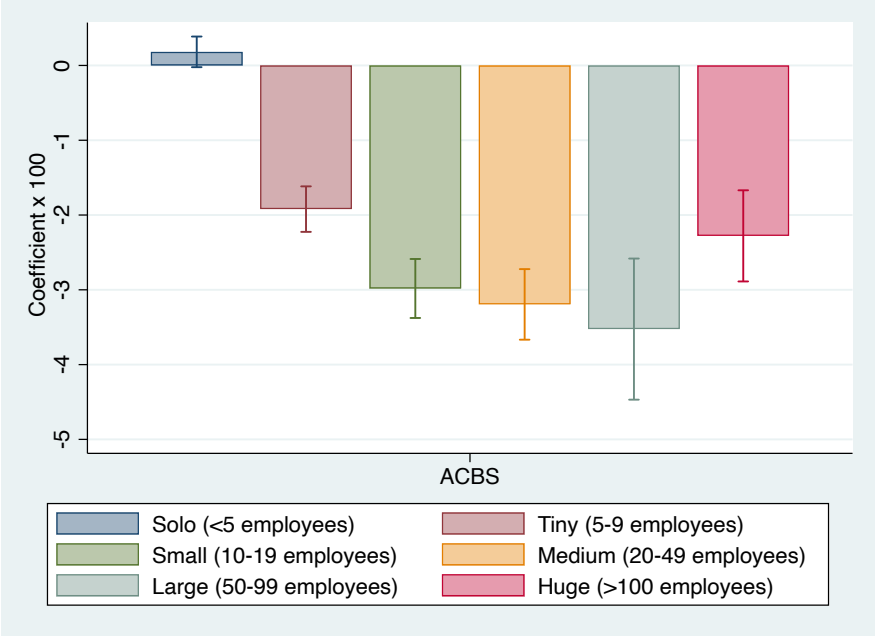

Figure 1: This figure presents a sub-sample analysis of establishment growth rates by size category using CBP data from 2013-2021. The bars represent coefficients multiplied by 100 on $ACBS$ in each size bin, as indicated in the legend. Error bars represent 95% confidence intervals.

3.2 Results by Sector

We analyze openings, closings, and labor outcomes by 2-digit NAICS sectors. In this section we use key industries: Food Service (NAICS 72), Construction (NAICS 23), Arts/Entertainment/Recreation (NAICS 71), Transportation (NAICS 48-49), and Information (NAICS 51). We exclude data containing fewer than three observations, as these are redacted by the census, and data flagged for quality concerns.

Our results show that restrictions generally slow economic activity, but the response varies by industry. The food service and construction industries are harder hit, with decreases in establishment entry rates and increases in exit rates. In contrast, the transportation and information sectors show rising establishment entry rates despite the restrictions. However, the information and transportation sectors

still experienced an increase in exit rates.[9]

We find that the food service and construction industries experience adverse effects due to county-level restrictions across all metrics. Table 8 shows the impact on the food service industry, while Table 9 shows the effects on the construction industry. These sectors show decreases in establishment entry rates, increases in establishment exit rates, reductions in net job creation, and reallocation falling below zero. Column 1 of Table 9 shows that a one standard deviation increase in the stringency index decreases the establishment entry rate in the construction service sector by $43 \times -.0135 = -.58$. Compared to a median rate of 13, this decrease represents 4% of the median. Column 2 shows that the same increase in the ACBS increases the establishment exit rate by $43 \times .0078 = .34$, which constitutes 3% of the median of 11.[10]

Unlike the food service and construction sectors, the transportation and information sectors show increasing establishment entry rates in response to restriction stringency. Table 10 contains our findings for the transportation sector, and Table 11 for the information sector. In the transportation sector, a one standard deviation increase in the ACBS leads to an increase in entry rates, as shown in Column 1 of Table 10: $43 \times .0068 = .29$ (2% of the median of 14). Column 2 indicates that exit rates increase by $43 \times .0128 = .55$ (5% of the median of 11). Column 6 of Table 10 illustrates that exits and job losses counteract the job gains from new establishments, thus reducing net job creation. In the information sector, both entry and exit rates increase with a one standard deviation increase in the ACBS, as recorded in Columns 1 and 2 of Table 11: entry rates increase by $43 \times .0062 = .27$ (2% of the median of 12) and exit rates by $43 \times .0073 = 0.31$ (3% of the median of 11).

[9]Previous research examines how capital was allocated across sectors due to the COVID-19 pandemic (Bahaj, Piton, and Savagar, 2024; Duchin and Harford, 2021; Decker and Haltiwanger, 2023; Chetty, Friedman, and Stepner, 2024).

[10]The construction sector is not included in the stringency index and was often considered an essential business line that was not subject to any operating capacity restrictions.

Table 8: Impact of COVID Restrictions on Food Service Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0082***	0.0277***	0.0168***	0.0787***	-0.0033***	-0.0918***	-0.0131***	-0.0175***
	(0.0010)	(0.0010)	(0.0010)	(0.0018)	(0.0011)	(0.0024)	(0.0014)	(0.0020)
deaths	0.0002	-0.0007	-0.0006	-0.0121***	0.0001	0.0141***	0.0020***	0.0042***
	(0.0004)	(0.0004)	(0.0005)	(0.0008)	(0.0005)	(0.0011)	(0.0007)	(0.0009)
PPP	-0.0001	0.0005***	0.0006***	0.0030***	-0.0001	-0.0032***	-0.0003***	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)
Observations	15,834	15,834	15,834	15,834	15,834	15,834	15,834	15,834
R^2	0.521	0.510	0.347	0.724	0.397	0.691	0.494	0.443
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. The dependent variables are scaled by the number of establishments (or employment) in the food service sector in the county year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table 9: Impact of COVID Restrictions on Construction Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0135***	0.0078***	-0.0001	0.0079***	-0.0058***	-0.0237***	-0.0158***	-0.0080***
	(0.0010)	(0.0010)	(0.0011)	(0.0020)	(0.0012)	(0.0033)	(0.0021)	(0.0023)
deaths	0.0003	0.0032***	0.0003	0.0007	-0.0003	0.0002	0.0009	-0.0058***
	(0.0005)	(0.0005)	(0.0005)	(0.0009)	(0.0006)	(0.0015)	(0.0010)	(0.0011)
PPP	-0.0002***	0.0003***	0.0001	0.0009***	0.0001	-0.0017***	-0.0007***	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Observations	16,470	16,470	16,470	16,470	16,470	16,470	16,470	16,470
R^2	0.646	0.544	0.364	0.388	0.380	0.234	0.466	0.580
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. The dependent variables are scaled by the number of establishments (or employment) in the construction sector in the county year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table 10: Impact of COVID Restrictions on Transportation Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0068***	0.0128***	-0.0015	0.0166***	0.0089***	-0.0106*	0.0060	0.0157***
	(0.0020)	(0.0018)	(0.0026)	(0.0036)	(0.0030)	(0.0054)	(0.0040)	(0.0044)
deaths	-0.0077***	0.0043***	-0.0000	0.0025	-0.0070***	-0.0105***	-0.0080***	-0.0038*
	(0.0010)	(0.0009)	(0.0013)	(0.0017)	(0.0014)	(0.0026)	(0.0019)	(0.0021)
PPP	-0.0001	0.0003***	-0.0003	0.0009***	0.0010***	-0.0008**	0.0002	-0.0005
	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0004)	(0.0003)	(0.0003)
Observations	10,547	10,547	10,547	10,547	10,547	10,547	10,547	10,547
R^2	0.617	0.474	0.243	0.305	0.274	0.242	0.297	0.349
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. The dependent variables are scaled by the number of establishments (or employment) in the transportation sector in the county year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table 11: Impact of COVID Restrictions on Information Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0062***	0.0073***	0.0077***	-0.0032	0.0007	0.0099	0.0067*	-0.0027
	(0.0022)	(0.0020)	(0.0030)	(0.0048)	(0.0029)	(0.0061)	(0.0041)	(0.0053)
deaths	-0.0001	0.0020**	0.0014	-0.0006	0.0014	0.0026	0.0020	-0.0006
	(0.0010)	(0.0009)	(0.0014)	(0.0022)	(0.0013)	(0.0029)	(0.0019)	(0.0025)
PPP	0.0006***	0.0001	-0.0001	-0.0014***	0.0003	0.0016***	0.0002	0.0003
	(0.0002)	(0.0001)	(0.0002)	(0.0003)	(0.0002)	(0.0004)	(0.0003)	(0.0004)
Observations	9,234	9,234	9,234	9,234	9,234	9,234	9,234	9,234
R^2	0.664	0.634	0.274	0.324	0.299	0.294	0.348	0.442
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. The dependent variables are scaled by the number of establishments (or employment) in the information sector in the county year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

3.3 Results by Sector Telecommuting

We examine how differences in industry telecommuting influence our results. We classify industries by their potential for telecommuting based on the methodology of Dingel and Neiman (2020).

We estimate the following specification:

$$\begin{aligned} Y_{ijt} = {} & \beta_A \text{ACBS}_{it} + \beta_D \text{Deaths}_{it} + \beta_P \text{PPP}_{it} \\ & + \beta_T \text{Telecommutable}_{ijt} + \beta_{AT} \text{ACBS\_Telecomm}_{ijt} \\ & + \beta_{DT} \text{Deaths\_Telecomm}_{ijt} + \beta_{PT} \text{PPP\_Telecomm}_{ijt} \\ & + \theta_t + \gamma_i + \epsilon_{ijt} \end{aligned}$$

where Y_{itj} includes labor and business dynamics for county i in sector j, $Deaths_{it}$ is the COVID-19 mortality rate, PPP_{it} is the dollar amount of PPP loans per capita, θ_t is a year fixed effect, and γ_i is a county fixed effect. $ACBS_{it}$, $Deaths_{it}$, and PPP_{it} take a value of 0 for years prior to 2020. $X\_Telecomm_{ijt}$ is a measure of variable X for the county times the industry's telecommutable status, which takes on the value of 0 for non-telecommutable and 1 for telecommutable.

To compare telecommutable to non-telecommutable sectors, we confine our sample to include industries in the top five and bottom five telecommutable sectors. Thus, β_A represents the influence of the stringency index on non-telecommutable industries, and β_{AT} represents the difference in Y_{ijt} for telecommutable and non-telecommutable industries. The top five telecommutable industries include: Information (NAICS 51), Finance and Insurance (NAICS 52), Professional, Scientific, and Technical Services (NAICS 54), Management of Companies and Enterprises (NAICS 55), and Educational Services (NAICS 61). The bottom five non-telecommutable industries include: Agriculture, Forestry, Fishing and Hunting (NAICS 11), Construction (NAICS 23),

Retail Trade (NAICS 44-45), Transportation and Warehousing (NAICS 48-49), and Accommodation and Food Services (NAICS 72).

Figure 2 illustrates our results for establishment entry, establishment exit, and net job creation for telecommutable vs non-telecommutable sectors. The first three bars over $ACBS$ plot β_A for establishment entry rates, establishment exit rates, and net job creation rates. The last three bars over $ACBS\_Telecomm$ display the same dependent variables for β_{AT}. Figure 2 highlights the comparative resilience of net job creation for telecommutable sectors relative to non-telecommutable sectors. The figure also shows a slight decrease in establishment entry rates for telecommutable sectors relative to non-telecommutable sectors. The difference in establishment exit rates is not statistically significant.

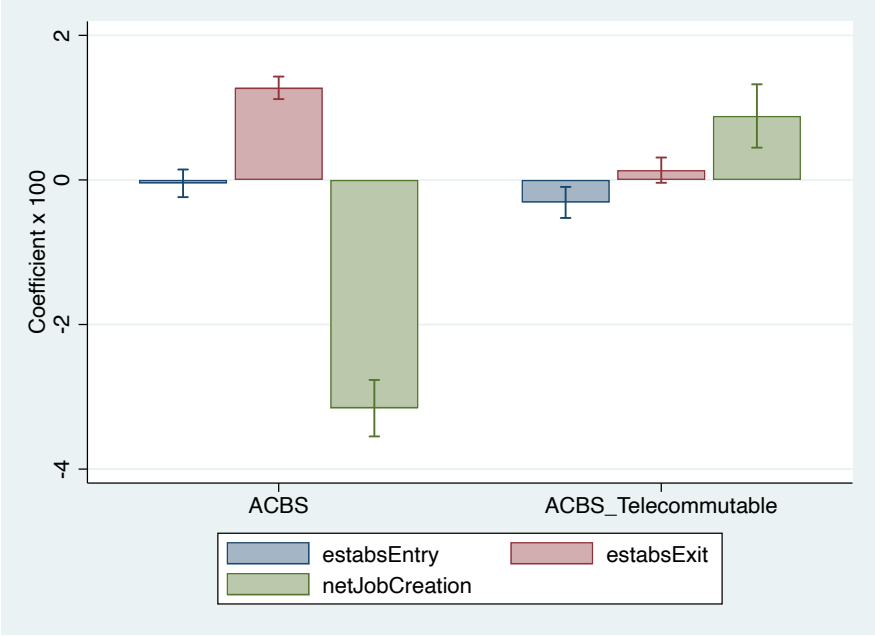

Figure 2: This figure displays the regression coefficients multiplied by 100 for the top 5 and bottom 5 telecommutable sectors using BDS data from 2013-2021. The first three bars represent the coefficients for $ACBS$. The next three bars show the coefficients for $ACBS\_Telecomm$. Error bars represent 95% confidence intervals.

Table 12 provides a full comparison between telecommutable and non-telecommutable sectors. In Column 1, the change in establishment entry rates for non-telecommutable

sectors is not statistically significant; however, the difference between telecommutable and non-telecommutable sectors is statistically significant. In Column 2, a one standard deviation increase in the ACBS increases the exit rate for non-telecommutable sectors by $43 \times .0127 = .55$, which is 6% of the median exit rate of 9. For telecommutable sectors, the same increase in the ACBS increases the exit rate by $43 \times (.0127 + .0014) = .61$, representing 7% of the median exit rate of 9. However, the coefficient on $ACBS\_Telecomm$ is not statistically significant.

Net job creation rates differ between telecommutable and non-telecommutable sectors. Increasing the ACBS by one standard deviation decreases net job creation rates for non-telecommutable sectors by $43 \times -.0316 = -1.36$ (see Column 6). With a median net job creation rate of 2, this reduction represents 68% of the median. For telecommutable sectors, net job creation rates drop by $43 \times (-.0316 + .0088) = -.98$, relative to a median of 2 this represents 49% of the median. This is further evidence that while the COVID-19 business capacity limits targeted non-telecommutable business lines, damage was also done to other firms that were not directly targeted.

Table 12: Sector Response to County COVID Restrictions by Telecommuting Status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0005	0.0127***	0.0086***	0.0294***	0.0020*	-0.0316***	-0.0022	0.0029*
	(0.0010)	(0.0008)	(0.0009)	(0.0015)	(0.0010)	(0.0020)	(0.0015)	(0.0017)
deaths	0.0005	0.0013***	-0.0003	-0.0030***	-0.0014***	0.0013	-0.0018**	-0.0024***
	(0.0005)	(0.0004)	(0.0004)	(0.0007)	(0.0005)	(0.0010)	(0.0007)	(0.0008)
PPP	-0.0001**	0.0004***	0.0000	0.0009***	0.0003***	-0.0009***	-0.0000	0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
telecommutable	-1.3026***	-0.5615***	-0.2565***	0.0411	-0.9677***	-2.0082***	-1.9671***	-2.2067***
	(0.0309)	(0.0251)	(0.0294)	(0.0464)	(0.0326)	(0.0630)	(0.0469)	(0.0535)
ACBS_telecomm	-0.0031***	0.0014	-0.0015	-0.0100***	-0.0038***	0.0088***	-0.0012	-0.0021
	(0.0011)	(0.0009)	(0.0010)	(0.0016)	(0.0012)	(0.0022)	(0.0017)	(0.0019)
deaths_telecomm	-0.0041***	0.0003	0.0010*	0.0008	0.0004	-0.0007	0.0000	-0.0028***
	(0.0006)	(0.0005)	(0.0005)	(0.0009)	(0.0006)	(0.0012)	(0.0009)	(0.0010)
PPP_telecomm	0.0003***	-0.0006***	-0.0002***	-0.0004***	-0.0002***	0.0006***	0.0002	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	114,913	114,913	114,913	114,913	114,913	114,913	114,913	114,913
R^2	0.215	0.163	0.044	0.093	0.069	0.084	0.097	0.147
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business and labor measures from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. The sample includes the top five and bottom five telecommutable sectors. Telecommutable sectors are defined as the top five Telecommutable 2-digit NAICS sectors according to Dingel and Neiman (2020). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

3.4 Results by Sector Flexibility and Contact Intensity

We use the classification from Albanesi and Kim (2021) to classify sectors as high- or low-contact and flexible or inflexible. Occupations are flexible if their inflexibility score is below the median. Occupations are high-contact if most of the occupation's interactions occur within 6 feet of another individual.

Within each NAICS code, we map SOC occupation codes to flexibility and contact categories. We calculate each category's labor share for the sector. By comparing employment shares in each category, we identify the industry's dominant occupational characteristic (flexible or inflexible, high-or low-contact). For instance, the Education sector is high-contact because it has more employment in high-contact occupations than in low-contact occupations. Using these comparisons, we classify each sector into one of four categories: flexible-high-contact, flexible-low-contact, inflexible-high-contact, or inflexible-low-contact. Table 13 shows this classification.

Next, we estimate the following specification to compare above and below median contact sectors:

$$\begin{aligned} Y_{ijt} = {} & \beta_A \text{ACBS}_{it} + \beta_D \text{Deaths}_{it} + \beta_P \text{PPP}_{it} \\ & + \beta_H \text{HighContact}_{ijt} + \beta_{AH} \text{ACBS\_HighContact}_{ijt} \\ & + \beta_{DH} \text{Deaths\_HighContact}_{ijt} + \beta_{PH} \text{PPP\_HighContact}_{ijt} \\ & + \theta_t + \gamma_i + \epsilon_{ijt} \end{aligned}$$

where Y_{itj} includes labor and business dynamics for county i in sector j, $Deaths_{it}$ is the COVID-19 mortality rate, PPP_{it} is the dollar amount of PPP loans per capita, θ_t is a year fixed effect, and γ_i is a county fixed effect. $ACBS_{it}$, $Deaths_{it}$, and PPP_{it} take a value of 0 for years prior to 2020. $X\_HighContact_{ijt}$ is a measure of variable X for the county times the industry's contact status, which takes on the value of 0 for

Table 13: Industry Flexibility and Contact Intensity

	Low Contact	**High Contact**
Inflexible	Agriculture (11) Mining (21) Utilities (22) Construction (23) Manufacturing (31-33) Transportation and Warehousing (48-49) Waste Management and Remediation (56) Arts, Entertainment, and Recreation (71) Other Services (81)	Healthcare (62)
Flexible	Professional, Scientific, and Tech Services (54) Management of Companies and Enterprises (55) Wholesale Trade (42) Retail Trade (44-45) Information (51) Finance and Insurance (52) Real Estate and Rental and Leasing (53)	Education (61)

Notes: This table shows our industry adaptation of the Albanesi and Kim (2021) measure. High contact sectors are defined as 2-digit NAICS where the majority of employment is in occupations requiring work within 6 feet of other people. Flexible sectors are defined as 2-digit NAICS where the majority of employment is in flexible occupations.

low-contact and 1 for high-contact.

Figure 3 illustrates our results for establishment entry, establishment exit, and net job creation for high-vs low-contact sectors. The first three bars in the figure show the coefficients on $ACBS$. The subsequent three bars display the coefficients on $ACBS\_HighContact$. The bars over $ACBS\_HighContact$ show that high-contact sectors are more affected than their low-contact counterparts.

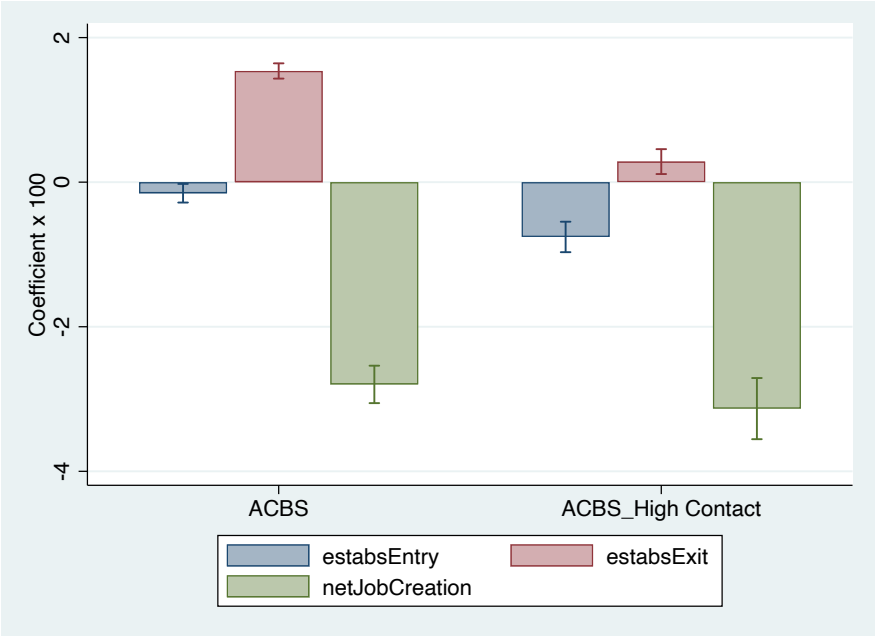

Figure 3: This figure displays the regression coefficients multiplied by 100 for high-contact and low-contact sectors using BDS data from 2013-2021. The first three bars show the coefficients for $ACBS$. The next three bars show the coefficients for $ACBS\_HighContact$. Error bars represent 95% confidence intervals.

Table 14 provides a full comparison between high-contact and low-contact sectors. Column 1 shows that a one standard deviation increase in the stringency index reduces the entry rate for low-contact sectors by $43 \times -.0015 = -.06$, representing approximately 1% of the median entry rate of 10 (See Panel C of Table 2). For high-contact sectors, the same increase in the stringency index decreases the entry rate by $43 \times (-.0015 - .0076) = -.39$, which is 4% of the median entry rate of 10. Column 2 shows that a one standard deviation increase in the stringency index raises the exit

rate for low-contact sectors by $43 \times .0154 = .66$, which is 7% of the median exit rate of 9. For high-contact sectors, the same increase in the stringency index raises the exit rate by $43 \times (.0154 + .0028) = .78$, representing 9% of the median exit rate of 9.

Increasing the stringency index by one standard deviation decreases net job creation rates for low-contact sectors by $43 \times -.0280 = -1.20$ (see Column 4). With a median net job creation rate of 2, this reduction represents 60% the median. For high-contact sectors, Column 4 shows that net job creation rates drop by $43 \times (-.0280 - .0313) = -2.55$, which is approximately 128% of the median rate.

Table 14: Response to County COVID Restrictions by Contact Intensity

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	estabsEntry	estabsExit	jobDestruction	netJobCreation	jobCreation	reallocation
ACBS	-0.0015**	0.0154***	0.0268***	-0.0280***	-0.0012	0.0005
	(0.0007)	(0.0005)	(0.0010)	(0.0013)	(0.0010)	(0.0012)
deaths	-0.0010***	0.0018***	-0.0028***	0.0018***	-0.0010**	-0.0032***
	(0.0003)	(0.0003)	(0.0005)	(0.0006)	(0.0005)	(0.0005)
PPP	-0.0002***	0.0001***	0.0008***	-0.0010***	-0.0002***	-0.0002**
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
highcontactsector	-0.3106***	-0.8826***	-2.0497***	0.2821***	-1.7676***	-1.9703***
	(0.0299)	(0.0245)	(0.0456)	(0.0600)	(0.0445)	(0.0523)
ACBS_highcontact	-0.0076***	0.0028***	0.0202***	-0.0313***	-0.0112***	-0.0131***
	(0.0011)	(0.0009)	(0.0016)	(0.0022)	(0.0016)	(0.0019)
deaths_highcontact	0.0008	0.0015***	0.0034***	-0.0011	0.0023***	0.0043***
	(0.0006)	(0.0005)	(0.0008)	(0.0011)	(0.0008)	(0.0010)
PPP_highcontactsector	0.0004***	-0.0003***	-0.0009***	0.0014***	0.0005***	0.0007***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	211,292	211,292	211,292	211,292	211,292	211,292
R^2	0.178	0.160	0.103	0.089	0.078	0.121
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business and labor measures from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. High contact sectors are defined as 2-digit NAICS where the majority of employment is in high contact occupations according to Albanesi and Kim (2021). High contact sectors include Healthcare (NAICS 62) and Education (NAICS 61). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Next, we estimate the following specification to compare above and below median flexibility sectors:

$$\begin{aligned} Y_{ijt} = \beta_A \text{ACBS}_{it} + \beta_D \text{Deaths}_{it} + \beta_P \text{PPP}_{it} \\ + \beta_F \text{Flexible}_{ijt} + \beta_{AF} \text{ACBS\_Flexible}_{ijt} \\ + \beta_{DF} \text{Deaths\_Flexible}_{ijt} + \beta_{PF} \text{PPP\_Flexible}_{ijt} \\ + \theta_t + \gamma_i + \epsilon_{ijt} \end{aligned}$$

where Y_{itj} includes labor and business dynamics for county i in sector j, $Deaths_{it}$ is the COVID-19 mortality rate, PPP_{it} is the dollar amount of PPP loans per capita, θ_t is a year fixed effect, and γ_i is a county fixed effect. $ACBS_{it}$, $Deaths_{it}$, and PPP_{it} take a value of 0 for years prior to 2020. $X\_Flexible_{ijt}$ is a measure of variable X for the county times the industry's flexibility status, which takes on the value of 0 for inflexible sectors and 1 for flexible sectors.

Figure 4 shows establishment entry, exit, and net job creation for flexible vs. inflexible sectors. The first three bars represent the coefficients on $ACBS$, while the next three show the coefficients on $ACBS\_Flexible$. The $ACBS\_Flexible$ coefficients reveal that, compared to inflexible sectors, flexible sectors have fewer establishment entries, fewer exits, and higher net job creation.

Table 15 provides a full comparison between flexible and inflexible sectors. In Column 1, a one standard deviation increase in the stringency index reduces the entry rate for inflexible sectors by $43 \times -.0016 = -.07$, representing less than 1% of the median entry rate of 10. For flexible sectors, the same increase in the stringency index decreases the entry rate by $43 \times (-.0016 - .0026) = -.18$, which is 2% of the median entry rate of 10. Column 2 shows that a one standard deviation increase in the ACBS increases the exit rate for inflexible sectors by $43 \times .0184 = .79$, which is

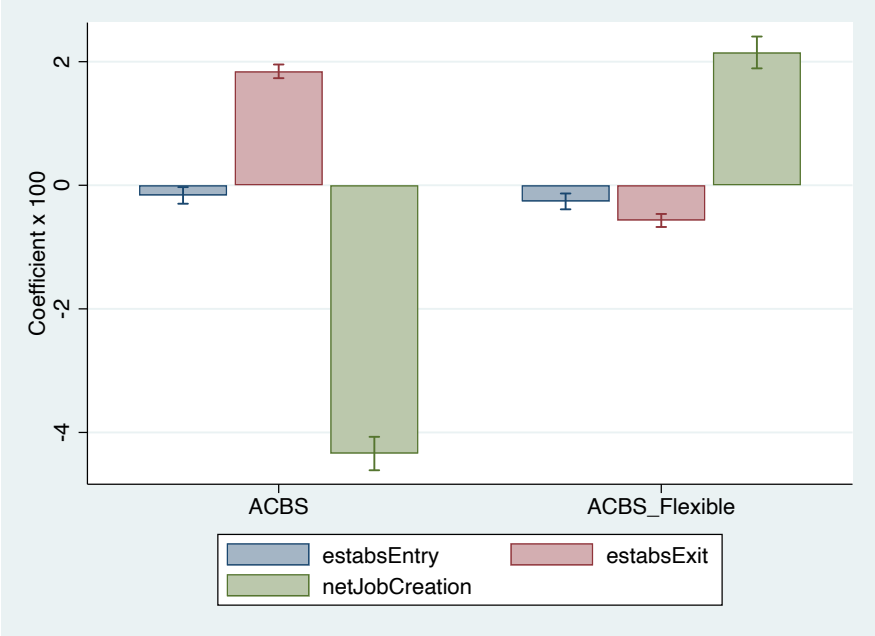

Figure 4: This figure displays the regression coefficients multiplied by 100 for flexible and inflexible sectors using BDS data from 2013-2021. The first three bars represent the coefficients for $ACBS$. The second three bars represent the coefficients for $ACBS\_Flexible$. Error bars represent 95% confidence intervals.

9% of the median exit rate of 9. For flexible sectors, the same increase in the ACBS increases the exit rate by $43 \times (.0184 - .0057) = .55$, representing 6% of the median exit rate of 9.

Net job creation rates differ between flexible and inflexible sectors. Increasing the ACBS by one standard deviation decreases net job creation rates for inflexible sectors by $43 \times -.0434 = -1.87$ (see Column 4). With a median net job creation rate of 2, this reduction represents 93% of the median. For flexible sectors, net job creation rates drop by $43 \times (-.0434 + .0215) = -.94$, or 47% of the median rate of 2.

Table 15: Response to County COVID Restrictions by Occupation Flexibility

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	estabsEntry	estabsExit	jobDestruction	netJobCreation	jobCreation	reallocation
ACBS	-0.0016**	0.0184***	0.0402***	-0.0434***	-0.0032***	0.0004
	(0.0007)	(0.0006)	(0.0010)	(0.0014)	(0.0010)	(0.0012)
deaths	0.0000	0.0020***	-0.0012**	0.0003	-0.0010*	-0.0019***
	(0.0003)	(0.0003)	(0.0005)	(0.0007)	(0.0005)	(0.0006)
PPP	-0.0000	0.0002***	0.0008***	-0.0007***	0.0001	0.0002**
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
flexiblesector	-0.7946***	-0.1227***	0.0808**	-1.2388***	-1.1580***	-0.3278***
	(0.0230)	(0.0189)	(0.0352)	(0.0463)	(0.0344)	(0.0406)
ACBS_flexible	-0.0026***	-0.0057***	-0.0215***	0.0215***	-0.0000	-0.0048***
	(0.0007)	(0.0005)	(0.0010)	(0.0013)	(0.0010)	(0.0012)
deaths_flexible	-0.0019***	0.0003	-0.0022***	0.0031***	0.0009	-0.0013*
	(0.0004)	(0.0004)	(0.0007)	(0.0009)	(0.0006)	(0.0008)
PPP_flexible	-0.0005***	-0.0005***	-0.0006***	-0.0007***	-0.0013***	-0.0013***
	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	211,292	211,292	211,292	211,292	211,292	211,292
R^2	0.186	0.157	0.104	0.092	0.076	0.115
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business and labor measures from the BDS. Variables are at the county-year-sector level from 2013-2021. Table 1 contains variable definitions. Flexible sectors are defined as 2-digit NAICS where the majority of employment is in flexible occupations according to Albanesi and Kim (2021). Flexible sectors include Professional, Scientific, and Tech Services (54), Management of Companies and Enterprises (55), Wholesale Trade (42), Retail Trade (44-45), Information (51), Finance and Insurance (52), Real Estate and Rental and Leasing (53), and Education (61). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

4 Sensitivity Analysis

4.1 BDS Establishment Size Dynamics

The results in Figure 1 show a notable decline in growth among establishments with more than 100 employees. We use BDS data categorized by firm size, county, and year to explore the reasons behind this trend. The data are grouped into three size bins: 1-19, 20-499, and 500 or more employees.

Overall, the selection of establishment size bins and the choice of data source do not alter the outcomes of our analysis on establishment size. The results, as illustrated in Tables A.1, A.2, and A.3, consistently show that increasing the stringency index leads to a decrease in establishment entries, an increase in exits, and a reduction in net job creation across all establishment size categories.

4.2 Pre-period Selection

To assess the robustness of our main results, which use 2013 to the onset of COVID-19 as the pre-period, we test the impact of varying the starting points of the analysis. Specifically, we compare results using two alternative pre-periods: from 2015 and from 2017, both extending to the onset of COVID-19. The findings from these time frames align with our main results, confirming the reliability of our regression outcomes with different pre-periods. Tables A.8 and A.9 present the regression results using 2015 as the starting pre-period, whereas Tables A.7 and A.6 display the outcomes from a 2017 start point.

4.3 Clustering of Standard Errors

We repeat our main regression specifications, clustering standard errors at the state level to account for potential correlation of restrictions within each state. Tables A.4 and A.5 show the estimates for business dynamics and labor dynamics. Although, the statistical significance of the coefficients on entries and applications falls, the statistical significance and magnitudes of the coefficients on establishment exits, closures, and net job creation are similar to our benchmark specification without clustering.[11]

4.4 Orthogonalized ACBS

We construct an $excess\_ACBS$ measure by regressing the ACBS on the COVID death rate and retaining the residuals. This approach allows us to isolate the effect of restrictions that exceed what would be predicted based solely on the death rate. For these analyses, we include only counties with populations of at least 100,000 to simplify the process of bootstrapping standard errors. Specifically, we regress the stringency index on the COVID-19 death rate within each county. We then take the residuals from this regression as our $excess\_ACBS$ measure. These residuals represent the portion of the stringency index that cannot be explained by the death rate, effectively controlling for the severity of the pandemic's impact at the county level. We then use the $excess\_ACBS$ variable to test the robustness of our main findings, ensuring that our results are not confounded by variations in pandemic severity across counties. In the second stage, we run our main regression model, this time incorporating the orthogonalized $excess\_ACBS$ measure instead of the original $ACBS$ variable. We bootstrap the standard errors to account for potential heteroscedasticity and autocorrelation in the residuals.

[11] Abadie, Athey, Imbens, and Wooldridge (2023) show that clustering standard errors is not always required even when residuals within the same cluster are correlated.

Tables A.10 and A.11 present the results. With the exception of job creation from establishment births variable (see Column 3 of Table A.11), the coefficients are of similar magnitude and statistical significance as in our benchmark specification. This is not surprising given the low correlation between the COVID death rate and the stringency index (see Table 2).

5 Conclusions

Our analysis reveals the lasting economic effects of COVID-19 restrictions on U.S. county business dynamics and employment. Tighter restrictions lead to fewer business applications, more firm closures, and substantial job losses across sectors. Our sector-specific analysis uncovers varied impacts of restrictions. High-contact and non-telecommutable sectors suffer more, while telecommutable sectors show more labor resilience, although even telecommutable sectors are adversely affected by restrictions. Political entities generally tried to limit the damage done by restricting capacity only in "nonessential" high contact businesses. However, our results indicate that doing so also damages businesses that were not capacity-restricted. These findings highlight the challenge policymakers face when trying to balance public health measures with their economic consequences.

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APPENDIX

Table A.1: Impact of Restrictions on Establishment Sizes 1-19

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0052***	0.0169***	0.0108***	0.0361***	-0.0075***	-0.0509***	-0.0148***	0.0033***
	(0.0004)	(0.0004)	(0.0004)	(0.0006)	(0.0004)	(0.0009)	(0.0005)	(0.0009)
deaths	-0.0013***	0.0021***	0.0004**	-0.0007***	-0.0001	0.0004	-0.0003	-0.0057***
	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
PPP	-0.0000	0.0002***	0.0001***	0.0006***	-0.0001***	-0.0008***	-0.0002***	-0.0001**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Observations	26,708	26,708	26,708	26,708	26,708	26,708	26,708	26,708
R^2	0.860	0.665	0.598	0.655	0.773	0.564	0.805	0.733
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS for establishments with less than 20 employees. Variables are at the county-year-firm-size level from 2013-2021. Table 1 contains variable definitions. All dependent variables are listed as a rate per the county-establishment size bin. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.2: Impact of Restrictions on Establishment Sizes 20-499

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0011**	0.0028***	0.0034***	0.0321***	-0.0009	-0.0377***	-0.0056***	-0.0088***
	(0.0006)	(0.0005)	(0.0007)	(0.0011)	(0.0007)	(0.0016)	(0.0010)	(0.0015)
deaths	0.0002	0.0004*	-0.0009***	-0.0027***	-0.0001	0.0015**	-0.0012***	-0.0053***
	(0.0003)	(0.0002)	(0.0003)	(0.0005)	(0.0003)	(0.0007)	(0.0005)	(0.0007)
PPP	-0.0000	0.0001***	0.0001***	0.0010***	-0.0000	-0.0011***	-0.0001**	0.0002**
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Observations	10,517	10,517	10,517	10,517	10,517	10,517	10,517	10,517
R^2	0.635	0.545	0.431	0.723	0.505	0.676	0.711	0.653
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS for establishments with between 20-499 employees. Variables are at the county-year-firm-size level from 2013-2021. Table 1 contains variable definitions. All dependent variables are listed as a rate per the county-establishment size bin. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.3: Impact of Restrictions on Establishment Sizes 500+

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	estabsEntry	estabsExit	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	-0.0039***	0.0044***	0.0013	0.0056***	-0.0013	-0.0060***	-0.0004	-0.0007
	(0.0009)	(0.0008)	(0.0009)	(0.0016)	(0.0010)	(0.0023)	(0.0016)	(0.0018)
deaths	0.0006	-0.0011***	-0.0003	-0.0008	0.0002	-0.0012	-0.0020***	-0.0051***
	(0.0004)	(0.0004)	(0.0004)	(0.0008)	(0.0005)	(0.0011)	(0.0008)	(0.0009)
PPP	-0.0000	-0.0002***	-0.0001	0.0004***	0.0001*	-0.0007***	-0.0003**	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)	(0.0001)
Observations	12,720	12,720	12,720	12,720	12,720	12,720	12,720	12,720
R^2	0.565	0.623	0.300	0.470	0.290	0.364	0.397	0.596
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business sector outcomes from the BDS for establishments with more than 500 employees. Variables are at the county-year-firm-size level from 2013-2021. Table 1 contains variable definitions. All dependent variables are listed as a rate per the county-establishment size bin. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.4: Restrictions on County Business Activity with State-Clustered Standard Errors

	(1)	(2)	(3)	(4)
Dep. Var.	openings	applications	estabsExit	firmDeaths
ACBS	-0.0039	-0.2269*	0.0134***	0.0170***
	(0.0092)	(0.1247)	(0.0017)	(0.0043)
deaths	-0.0043***	0.0045	0.0016	-0.0018*
	(0.0016)	(0.0288)	(0.0011)	(0.0010)
PPP	-0.0001	0.0173**	0.0001**	0.0009***
	(0.0005)	(0.0081)	(0.0000)	(0.0001)
Observations	27,627	28,179	27,637	27,260
R^2	0.944	0.835	0.740	0.925
Year FEs	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes
State Cluster	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business outcomes from the BDS and CBP. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.5: Restrictions on County Labor Market Activity with State-Clustered Standard Errors

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0036***	0.0199***	-0.0016**	-0.0252***	-0.0053***	-0.0045
	(0.0012)	(0.0024)	(0.0007)	(0.0035)	(0.0018)	(0.0037)
deaths	-0.0002	-0.0024**	0.0001	0.0020	-0.0004	-0.0042***
	(0.0004)	(0.0010)	(0.0003)	(0.0017)	(0.0008)	(0.0013)
PPP	-0.0001	0.0005***	0.0000	-0.0007***	-0.0002**	-0.0002*
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Observations	27,637	28,157	27,622	28,157	28,157	28,157
R^2	0.304	0.536	0.410	0.459	0.551	0.567
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on labor outcomes from the BDS. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.6: 2017 Pre-Period Robustness Impact of COVID Restrictions on County Business Activity

	(1)	(2)	(3)	(4)
Dep. Var.	openings	applications	estabsExit	firmDeaths
ACBS	-0.0078***	-0.1925***	0.0142***	0.0157***
	(0.0008)	(0.0115)	(0.0004)	(0.0006)
deaths	-0.0051***	0.0074	0.0017***	-0.0013***
	(0.0003)	(0.0050)	(0.0002)	(0.0002)
PPP	0.0004***	0.0132***	0.0000	0.0005***
	(0.0001)	(0.0008)	(0.0000)	(0.0000)
Observations	15,329	15,655	15,332	15,129
R^2	0.952	0.887	0.771	0.939
Year FEs	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business outcomes from the BDS and CBP. Variables are at the county-year level from 2017-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.7: 2017 Pre-Period Impact of COVID Restrictions on County Labor Market Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0046***	0.0218***	-0.0015***	-0.0267***	-0.0049***	-0.0046***
	(0.0005)	(0.0008)	(0.0005)	(0.0012)	(0.0007)	(0.0010)
deaths	-0.0001	-0.0028***	-0.0001	0.0019***	-0.0009***	-0.0042***
	(0.0002)	(0.0004)	(0.0002)	(0.0005)	(0.0003)	(0.0004)
PPP	-0.0001**	0.0004***	0.0001**	-0.0004***	-0.0000	-0.0001
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
Observations	15,332	15,645	15,329	15,645	15,645	15,645
R^2	0.373	0.632	0.453	0.544	0.575	0.619
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on labor outcomes from the BDS. Variables are at the county-year level from 2017-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.8: 2015 Pre-Period Impact of COVID Restrictions on County Business Activity

	(1)	(2)	(3)	(4)
Dep. Var.	openings	applications	estabsExit	firmDeaths
ACBS	-0.0052***	-0.2105***	0.0136***	0.0161***
	(0.0007)	(0.0108)	(0.0003)	(0.0005)
deaths	-0.0044***	0.0067	0.0015***	-0.0018***
	(0.0003)	(0.0047)	(0.0001)	(0.0002)
PPP	0.0000	0.0159***	0.0000*	0.0006***
	(0.0001)	(0.0007)	(0.0000)	(0.0000)
Observations	21,482	21,917	21,479	21,209
R^2	0.946	0.854	0.758	0.931
Year FEs	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on business outcomes from the BDS and CBP. Variables are at the county-year level from 2015-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.9: 2015 Pre-Period Impact of COVID Restrictions on County Labor Market Activity

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
ACBS	0.0036***	0.0205***	-0.0014***	-0.0258***	-0.0053***	-0.0049***
	(0.0005)	(0.0008)	(0.0005)	(0.0011)	(0.0007)	(0.0009)
deaths	-0.0002	-0.0027***	-0.0000	0.0020***	-0.0007**	-0.0046***
	(0.0002)	(0.0003)	(0.0002)	(0.0005)	(0.0003)	(0.0004)
PPP	-0.0001***	0.0003***	0.0000	-0.0005***	-0.0001***	-0.0003***
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Observations	21,479	21,901	21,479	21,901	21,901	21,901
R^2	0.335	0.583	0.431	0.506	0.560	0.586
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population-weighted	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows population-weighted regressions of the ACBS on labor measures from the BDS. Variables are at the county-year level from 2015-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Table A.10: Orthogonalized Restrictions on County Business Activity

	(1)	(2)	(3)	(4)
Dep. Var.	openings	applications	estabsExit	firmDeaths
excess_ACBS	-0.0092***	-0.2585***	0.0106***	0.0116***
	(0.0016)	(0.0302)	(0.0007)	(0.0011)
deaths	-0.0026***	0.0295**	0.0007*	-0.0030***
	(0.0007)	(0.0124)	(0.0004)	(0.0006)
PPP	-0.0004**	0.0120***	0.0002***	0.0009***
	(0.0002)	(0.0034)	(0.0001)	(0.0002)
Observations	5,300	5,300	5,300	5,300
R^2	0.951	0.874	0.767	0.929
Year FEs	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes
Population	100,000+	100,000+	100,000+	100,000+
Population-weighted	No	No	No	No

Notes: This table shows population-weighted regressions of the ACBS on business outcomes from the BDS and CBP. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. Standard errors are bootstrapped using 1,000 iterations.

Table A.11: Orthogonalized Restrictions on County Labor Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	jobDestructionDeaths	jobDestruction	jobCreationBirths	netJobCreation	jobCreation	reallocation
excess_ACBS	0.0039***	0.0166***	-0.0009	-0.0206***	-0.0040***	-0.0095***
	(0.0008)	(0.0016)	(0.0009)	(0.0023)	(0.0014)	(0.0023)
deaths	-0.0002	-0.0025***	0.0005	0.0024**	-0.0002	-0.0046***
	(0.0004)	(0.0008)	(0.0004)	(0.0012)	(0.0007)	(0.0011)
PPP	0.0001	0.0007***	0.0001	-0.0009***	-0.0002	-0.0001
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Observations	5,300	5,300	5,300	5,300	5,300	5,300
R^2	0.336	0.576	0.496	0.523	0.614	0.523
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
County FEs	Yes	Yes	Yes	Yes	Yes	Yes
Population	100,000+	100,000+	100,000+	100,000+	100,000+	100,000+
Population-weighted	No	No	No	No	No	No

Notes: This table shows population-weighted regressions of the ACBS on labor outcomes from the BDS. Variables are at the county-year level from 2013-2021. Table 1 contains variable definitions. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. Standard errors are bootstrapped using 1,000 iterations.